



5S

IND E 237

# LEAN PRINCIPLES AND FIVE S

- Continuous Flow
- Pull Systems
- Standard Work
- Point Of Use
- Setup Reduction
- Visual Controls

# CONTINUOUS FLOW

## Continuous Flow Concepts

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**Traditional Production:**  
Batch Production—like a meandering  
stream with many stagnant pools, waterfalls,  
and eddies



**JIT Production:**  
Pipeline with fast-flowing product



V2R

# CONTINUOUS FLOW MANUFACTURING

- Continuous Flow Definition

Flow of work in a **level** manner through the operations—the **ideal** situation is **one-piece** flow at and between processes

- Benefits

CFP increases the **velocity**, **predictability** and **flexibility** of the process.

# CONTINUOUS FLOW

- Continuous Flow Desires
  - High Velocity
  - High Quality
  - No Waste
  - All Value Added
  - Low Cost
  - On Time Delivery
  - Flexibility

# CONTINUOUS FLOW

- Continuous Flow Detractors
  - Process Variations
  - Non Standard Work
  - Excessive WIP
  - Unbalanced Workload
  - Non Synchronous Systems
  - Complex Processes

# PULL PRODUCTION SYSTEM

- Pull System Definition

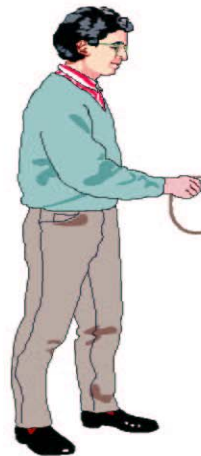
A customer-driven system that produces and moves products/services ***only*** when the customer needs it

# PULL PRODUCTION SYSTEM

## Customer Demand

Customer Needs

Production Heartbeat



Pull





# BENEFITS OF PULL PRODUCTION

- Reduces work-in-process
- Reduces paperwork
- Allows for more flexibility
- More responsive to what is actually happening
- Exposes waste
- Helps make problems and abnormal conditions obvious (must be dealt with)

# STANDARD WORK

## Standard Work – Definition

- The most effective method or process to complete a task using the least amount of resources producing the best quality product or service.
- Best Practice - Defines and standardizes the best current work practices.
- Reliable methods – repeatable, simple, maintainable, assuring consistent performance, minimizing variation

# STANDARD WORK

## Standard Work and 5S

- Standardizing the work and establishing a best practice is key to Five S implementation.
- Provides consistency in the operation, and low variation in the output.
- Provides a basis for improvement.

# POINT OF USE

## Point of Use – Definition

A principle that strives to bring all the necessary resources to the location where value is added in an effort to eliminate waste.

# POINT OF USE

## Point of Use Types:

- Materials
- Tools
- Instructions
- Supplies
- Parts
- Equipment
- Information

# SETUP TIME

## Setup Time – Definition

- The time from unloading the last part until the beginning of the run of the next good part.
- Preparing to do work.
- Setup time is non value adding.

# SETUP TIME

## Setup Time and 5S

- Organize the workplace so that setup is minimal.
- Address “mental setup” as well as equipment and tool setup.
- Find what is needed without searching.

# WHAT ARE THE 5S's

## The Five Rules of Workplace

Organization for a Lean Environment.

They help to expose waste and support the discipline needed to implement lean thinking.

The goal is to have a place for everything and everything in its place, clean and ready for use.



# THE 5S's

- Sorting – Just Beginning
- Simplifying – Focus on Basics
- Systematic Cleaning – Make it Visual
- Standardizing – Focus on Reliability
- Sustaining – Focus on Prevention

# THE 5S BENEFITS

To the Employee:

- Safer working areas
- Lower frustration
- Increased involvement in daily decisions
- Improved morale
- Less wasted time

# THE 5S BENEFITS

To the company:

- Lower costs
- Improved efficiency
- Improved quality and standardization
- Reduced space requirements
- Improved customer perception

# THE 5S FINANCIAL BENEFITS

- Labor Costs - Productivity
  - Direct
  - Indirect
- Material Costs – Inventory
- Overhead Costs
- Defect Costs
- Flow Time – Cycle Time Reduction
- Delivery Performance
- New Business - Additional Capacity

# 5S AS A FOUNDATION

- 5S provides a basis for organizational improvement
  - Starts to change the culture
  - Emphasizes and incorporates discipline
  - Establishes norms and expectations for a lean environment
- Incorporates the beginnings of many lean principles and tools

# SORTING

- Establish criteria for needed and unneeded
- Separate the needed from the unneeded
- Identify and isolate unneeded items and decide
- Remove unneeded items from the work area

# SORTING - BEFORE



# SORTING - BEFORE





# SORTING – EXCESS TOOLS



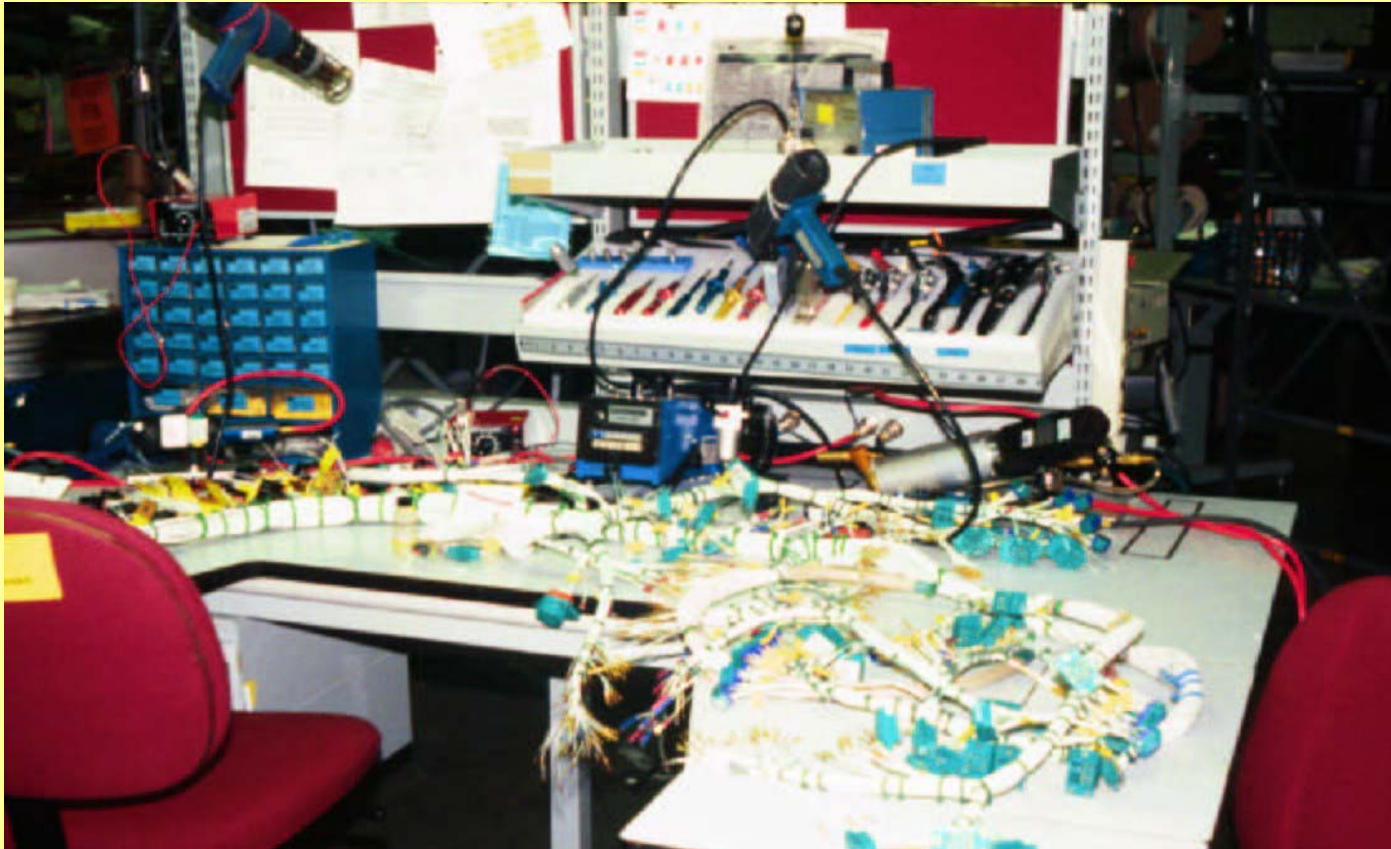
# SIMPLIFYING

- Identify proper location for needed items considering:
  - Frequency of use
  - Size
  - Is it shared?
  - Safety
- Visually indicate proper location
- Place at Point of Use

# SIMPLIFYING - BEFORE



# SIMPLIFYING - AFTER





# SIMPLIFYING - TOOLS FOR SETUP - BEFORE



# SIMPLIFYING - TOOLS FOR SETUP - AFTER



# SYSTEMATIC CLEANING

- Identify and label “normal” operating conditions
- Identify inspection points
- Establish standard cleaning agreements
- Clean area and equipment regularly
- Inspect while cleaning
- Perform preventative maintenance regularly

# STANDARDIZING

- Define how tasks should be accomplished
- Establish agreements
- Document the processes
- Communicate processes and changes
- Implement mess prevention



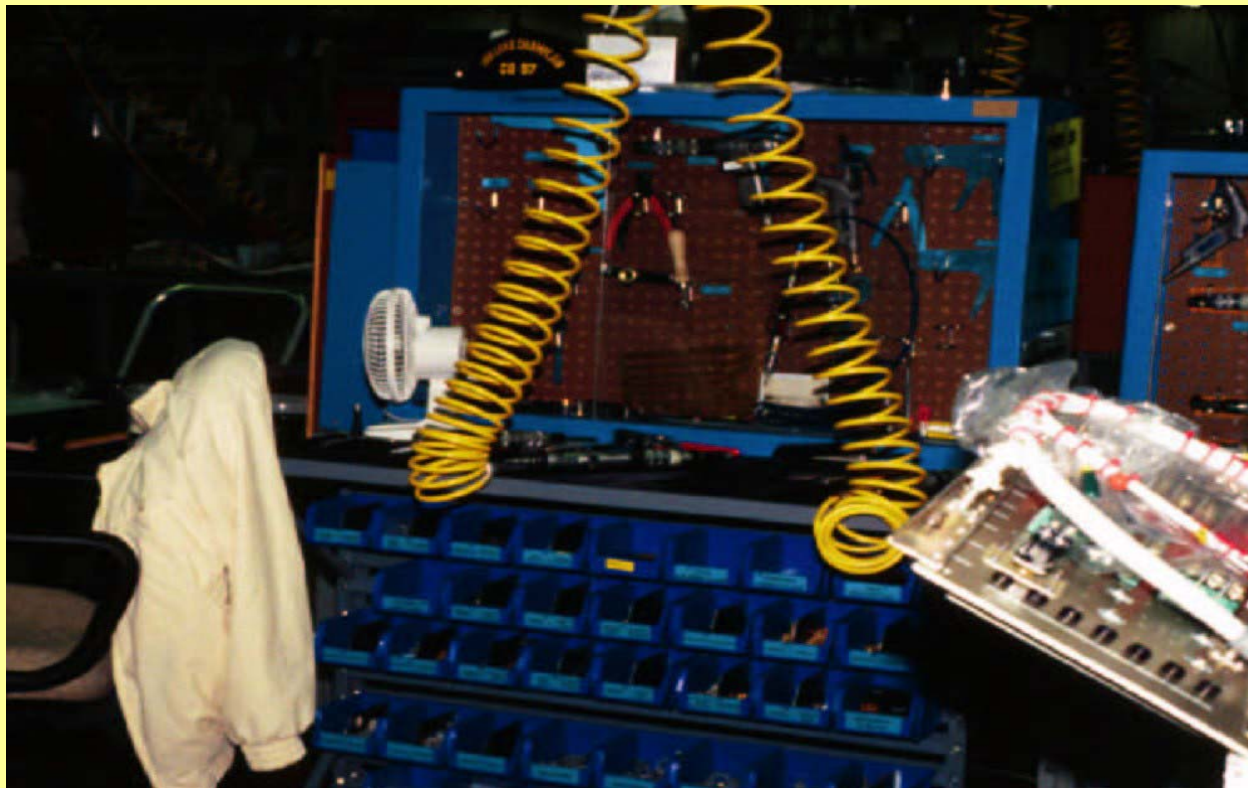
# STANDARDIZING – STORAGE CONTAINERS WITH LABELS



# STANDARDIZING – PROCESS SUPPORTED BY TOOL CART



# STANDARDIZING – PROCESS SUPPORTED ASSEMBLY BUILD CART

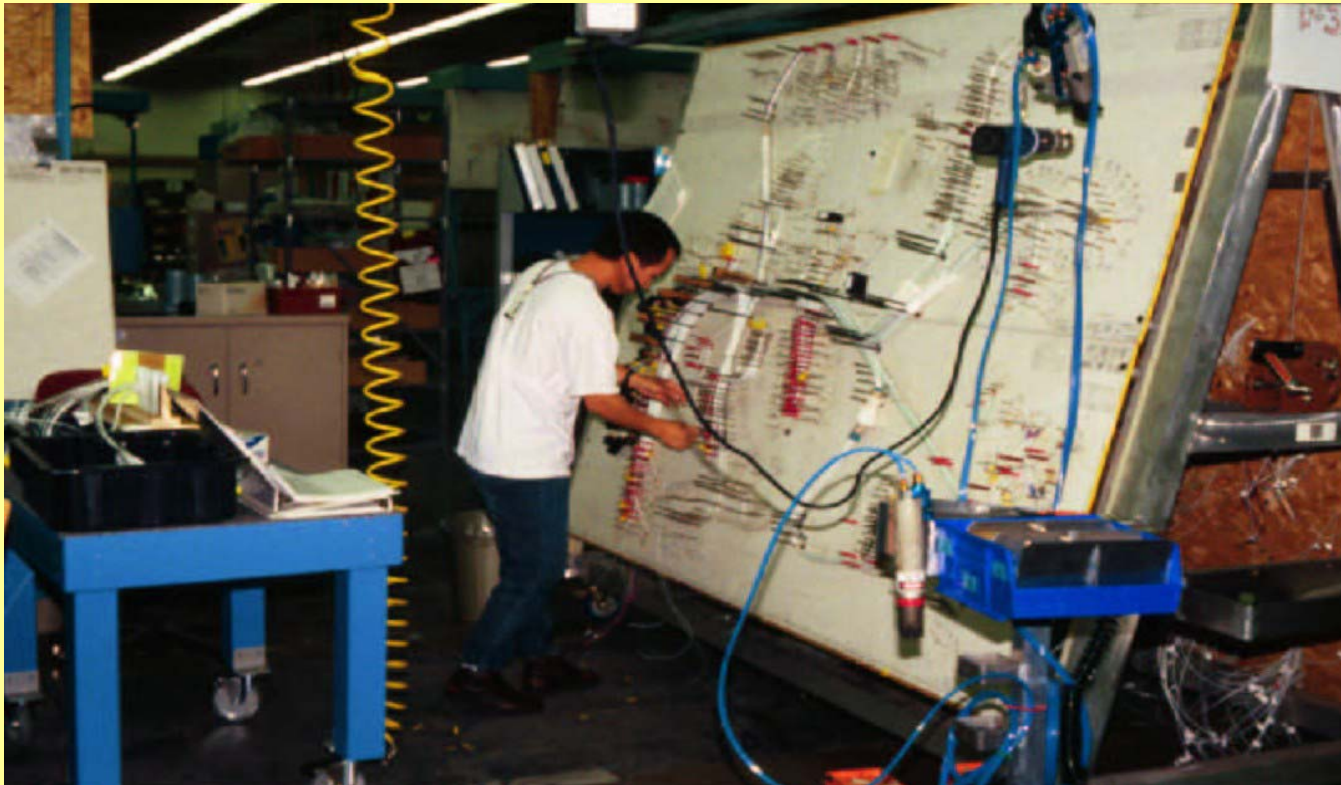


# STANDARDIZING – LOCATIONS FOR EACH TYPE OF WORK





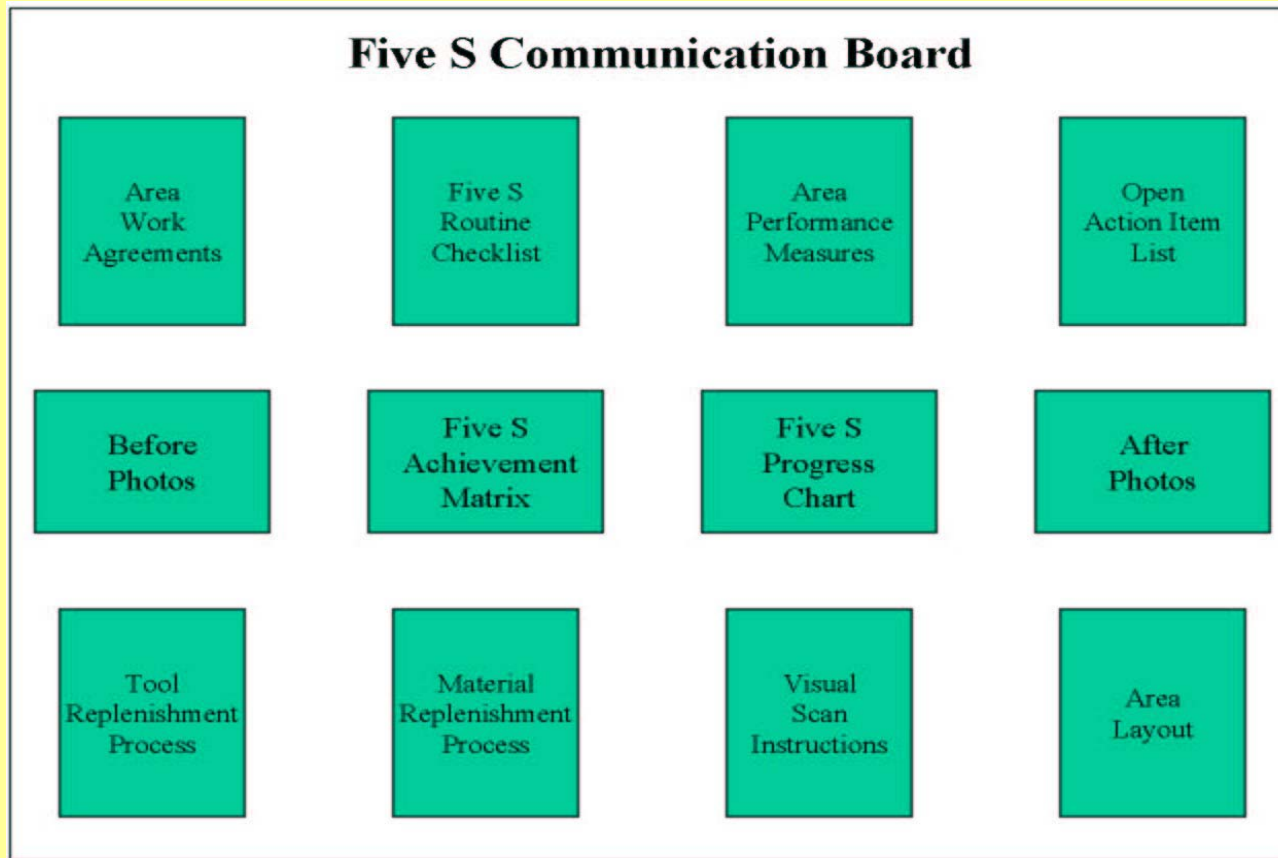
# STANDARDIZING – TOOLS AT POINT OF USE



# SUSTAINING

- Ensure that policies and agreements are followed
- Perform routine checks
- Measure the results
- Reward positive activities
- Review lessons learned and improve

# SUSTAINING – COMMUNICATION BOARD



# SUSTAINING – DAILY SCAN

Daily Visual Scan Instructions	
	Date _____
<b>Weld Equipment Storage Area</b>	
< Scan for Messes and Debris	- Location? _____
< Scan for Abnormal Conditions	- Location? _____
Actions - _____	
<b>Welder Equipment Maintenance Building</b>	
< Scan for Messes and Debris	- Location? _____
< Scan for Abnormal Conditions	- Location? _____
Actions - _____	
<b>Temp Vent Maintenance Area</b>	
< Scan for Messes and Debris	- Location? _____
< Scan for Abnormal Conditions	- Location? _____
Actions - _____	
<b>Temp Vent Storage Building</b>	
< Scan for Messes and Debris	- Location? _____
< Scan for Abnormal Conditions	- Location? _____
Actions - _____	



# SUSTAINING – ROUTINE CHECK LIST

Five S Routine Checklist						
Date	Work Area					
5S	No.	Description	1	2	3	4
Sort	1	Are there unneeded materials or supplies?				
	2	Are there unneeded machines or tools?				
	3	Have Unneeded items been marked for removal?				
	4	Have rules been established and posted regarding unneeded items?				
Straighten	5	Are locations outlined for tools and supplies?				
	6	Are communication boards organized and updated?				
	7	Are performance range indicators marked?				
	8	Are there max/ min indicators for materials and supplies?				
	9	Are safety areas and items clearly marked?				
	10	Are aisles marked and free of obstructions?				
Systematic Cleaning	11	Are tools and supplies returned to their designated locations?				
	12	Are floors clean and debris free?				
	13	Are tools working and equipment free of leaks and messes?				
	14	Are daily area work agreements established and used?				
Standardizing	15	Have specific cleaning tasks been assigned?				
	16	Are trash bins, scrap containers, recycle containers emptied daily?				
	18	Have rules and procedures been established to maintain				

# SUSTAINING - RATING

## 5S Levels of Achievement

<b>LEVEL 5</b>  <b>Focus on Prevention</b>	Cleanliness problem areas are identified and mess prevention actions are in place.	Needed items can be retrieved within 30 seconds and require a minimum number of steps.	Potential problems are identified and countermeasures are documented.	Reliable methods and standards for housekeeping, daily inspections, and workplace arrangement are shared and are used throughout similar work areas.	Root causes are eliminated and improvement actions focus on developing preventive methods.
<b>LEVEL 4</b>  <b>Focus on Reliability</b>	Work area has documented housekeeping responsibilities and schedules and the assignments are being consistently followed.	Needed items in work area are minimized in number, and are properly arranged for retrieval and use.	Inspection occurs during daily cleaning of work areas and equipment, and supplies are restocked.	Reliable methods and standards for housekeeping, daily inspections, and workplace arrangement are documented and followed by all members of the work group.	Sources and frequency of problems are documented as part of routine work, root causes are identified, and corrective action plans are developed.
<b>LEVEL 3</b>  <b>Make it Visual</b>	Initial cleaning has been performed and sources of spills and messes are identified and corrected.	Needed items are outlined, dedicated locations are properly labeled, and required quantities are determined.	Visual controls and indicators are established and marked for the work area, equipment, files and supplies.	Work group has documented agreements on visual controls, labeling of items, and required quantities of needed items.	Work group is routinely checking area to maintain 5S agreements.
<b>LEVEL 2</b>  <b>Focus on Basics</b>	Needed and not-needed items are identified and those not needed are removed from the work area.	Needed items are safely stored and organized according to frequency of use.	Key work area items to be checked are identified, and acceptable performance levels are documented.	Work group has documented agreements for needed items, organization, and work area controls.	Initial 5S level has been determined, and performance is documented and posted in work area.
<b>LEVEL 1</b>  <b>Just Beginning</b>	Needed and not-needed items are mixed throughout the work area.	Items are placed randomly throughout the workplace.	Key work area items checked are not identified and are unmarked.	Work area methods are not consistently followed and are undocumented.	Work area checks are randomly performed and there is no visual measurement of 5S performance.
	<b>Sorting</b>	<b>Simplifying</b>	<b>Systematic Cleaning</b>	<b>Standardizing</b>	<b>Sustaining</b>