



LEAN
SOLUTIONS
ACADEMY

A group of five people (three men and two women) in business attire are smiling and huddled together, looking down at something in their hands. The image is overlaid with a blue geometric design.

Lean & Six Sigma Training
Lean Yellow Belt
Certification

brought to you by:



PATRICK
ADAMS
CONSULTING

Meet Your Instructor



- Background
- Lean Solutions "Train-The-Trainer" Course
- Internationally Certified Trainer



CLASS SCHEDULE

Day 1

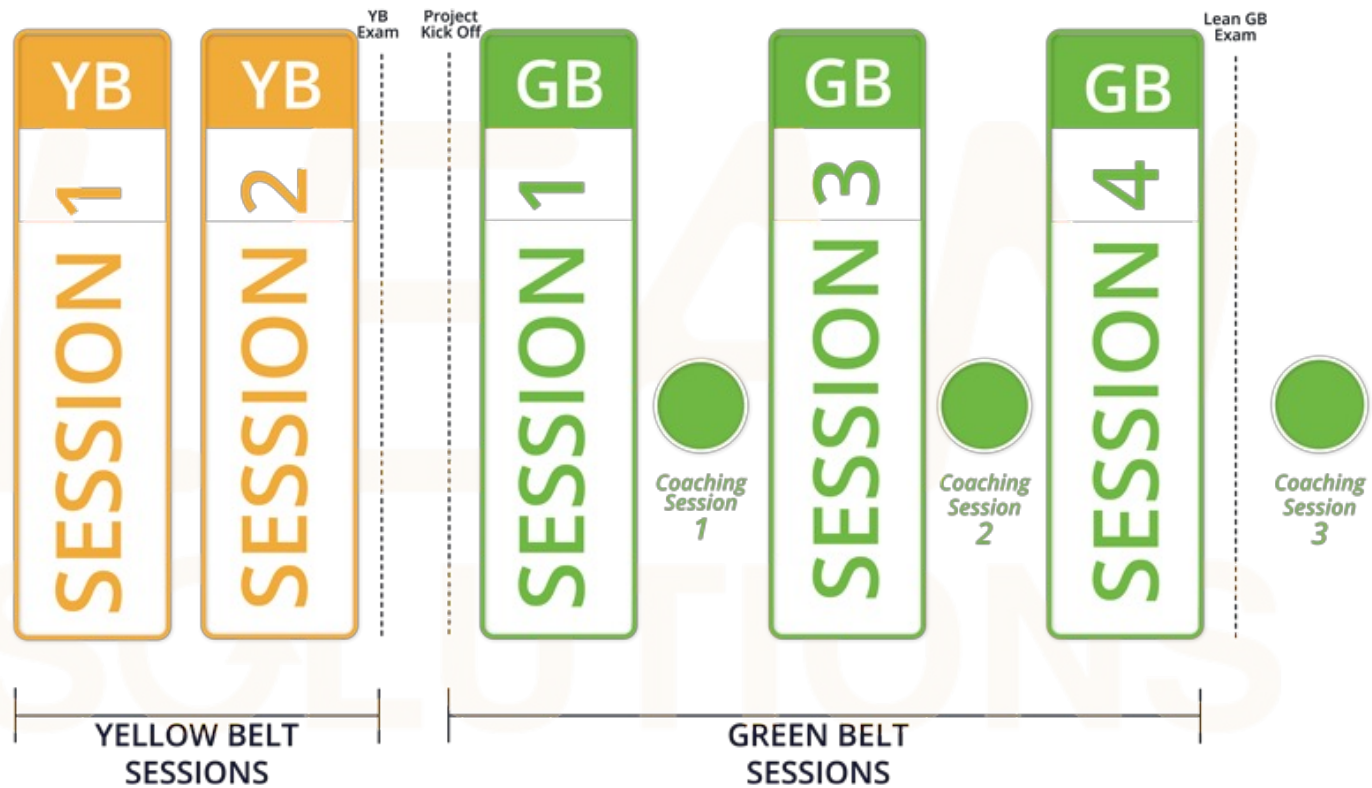
- Roles and Responsibilities of Belts
- What is Lean & Six Sigma?
- Lean Principles
- Standard Work
- 8 Wastes
- 5S
- Voice of the Customer (VOC) and CTQs Process
- Jidoka
- Poke Yoke

Day 2

- Day 1 Review
- PDCA
- Kaizen
- Pull
- Kanban
- Flow
- Visual Management
- SMED
- Total Productive Maintenance
- **YELLOW BELT EXAM**
(as Homework)

Yellow Belt	The Fundamentals of Lean Six Sigma	Defining a Process / CTQ
	History / Process / Cause & Effect	The 8 Elements of Waste / Belt Roles
	Principles of Lean / Six Sigma	5S / Lean Tools / Visual Management / SMED
	Process Mapping / DMAIC	Kanban / Poka-Yoke / Standardized Work
	PDCA / Kaizen & Kaizen Events	Lean & Six Sigma Belt Roles
	Kano Analysis	Total Productive Maintenance
	Voice of Customer, & Business	Value Add & Non Value Add Work
Lean Green Belt	Project Management	Fishbone Diagrams / Graphical Analysis
	Project Charter	Lean Metrics & Projects
	SIPOC	FMEA
	7-Quality Tools / Pareto Analysis	Facilitating a Kaizen Event
	Control Charts	Strategy Execution
	Control Plans	Hoshin Kanri
	Gantt Chart	Change Management
	Structured Problem Solving	
Six Sigma Green Belt	Six Sigma Statistics	Correlation and Regression
	Measurement Systems Analysis	Introduction to DOE
	Process Capability	Hypothesis Testing
Black Belt		
	Mann-Whitney / Kruskal-Wallis	Orthogonal Designs
	Friedman Mood's Median / Simple Linear Regression	Full Factorial Experiments & Designs
	1 Sample Sign / 1 Sample Wilcoxon	Fit, Diagnose Model and Center Points
	One and Two Sample Proportion	Taguchi Designs Control Phase
	Chi-Squared (Contingency Tables)	Statistical Process Control (SPC)
	Correlation / Regression Equations	Data Collection for SPC / I-MR Chart
	Regression Equations / Residuals Analysis	Xbar-R Chart / U Chart / P Chart
	Non- Linear Regression	NP Chart / X-S chart
	Multiple Linear Regression	CumSum Chart / EWMA Chart
	Confidence & Prediction Intervals	Binomial Distribution and Calculations
	Designed Experiments / OFAT	Poisson Distribution and Calculations
	Experiment Objectives	Design for Six Sigma (DFSS) / Hoshin Kanri
	Experimental Methods	Cost Benefit Analysis / ROI, Payback Period
	Experiment Design Considerations	
	Linear & Quadratic Mathematical Models	

BODY OF KNOWLEDGE



Homework

- ☐ Homework – Due before Day 2
- ☐ Homework – Due Before Day 3
- ☐ Homework – Due before Day 4
- ☐ Homework – Due before Day 5
- ☐ Homework – Review
- ☐ ILSSI Green Belt Exam Information

HOMework

As a Yellow Belt student, you are expected to review and complete the homework for each lesson.

The assignments can be accessed on the student dashboard inside your course.



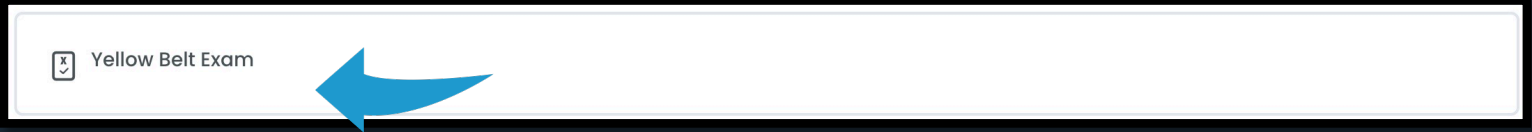
YELLOW BELT

CERTIFICATION EXAM

- Lifetime certification
- Done online on your student dashboard after training is finished
- Open Book
- 50 Multiple Choice Questions
- Pass mark is 70%
- Result issued immediately
- Retake is available

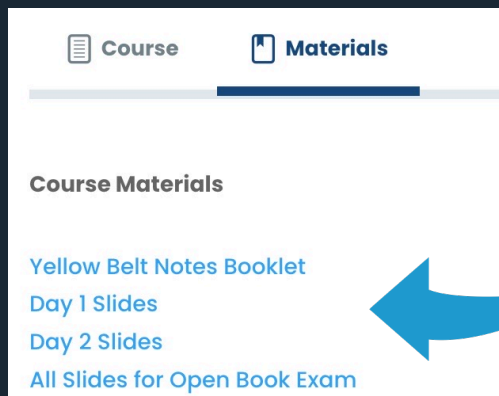
YELLOW BELT CERTIFICATION EXAM

Find information on how to access the exam on the student dashboard



Yellow Belt Exam

Download the class PowerPoint slides (as a searchable pdf) to help while studying for and taking the exam



LEAN SIX SIGMA ROLES & RESPONSIBILITIES

Champion + Executive Support

Black Belts

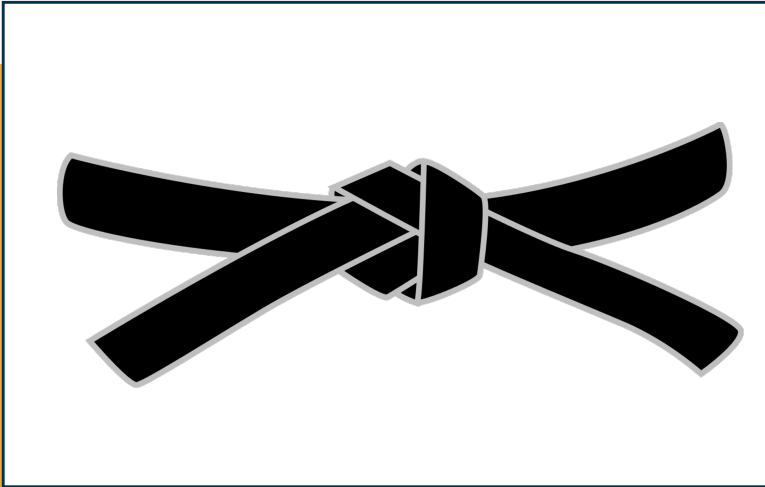
Green Belts

Yellow Belts

CHAMPION/ PROCESS OWNER

Champions help to identify and select the most important projects to work and break down political barriers and roadblocks for Lean Six Sigma to succeed

- Assist with Project selection and initiation
- Obtain needed project resources and eliminate roadblocks
- Participate in project review meetings
- Provide Governance / Ask the right questions
- Set up a training programs

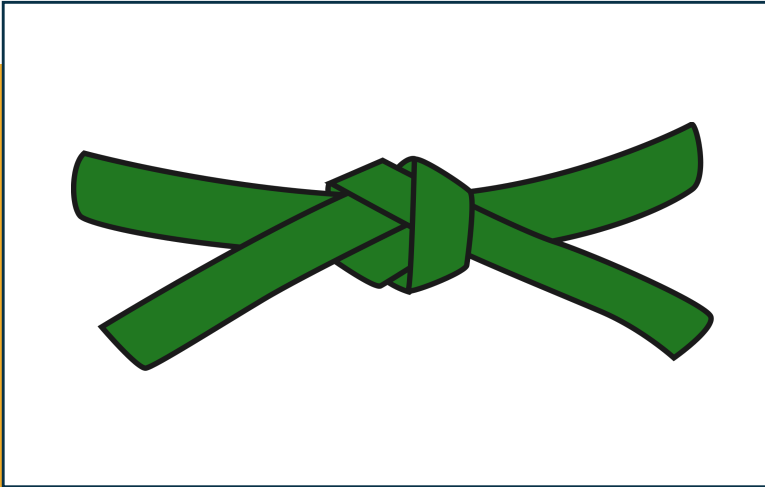


BLACK BELT

Black Belts are Lean Six Sigma process experts, think strategically and lead larger projects within the business.

- Approx 1 Black Belt every 50 - 100 employees (1%)
- Dedicated to process improvement 100% of time
- Project team leader for larger / high profile projects
- Facilitates project teams and helps Green belts
- Thinks strategically and towards Enterprise level goals
- Works cross-functionally



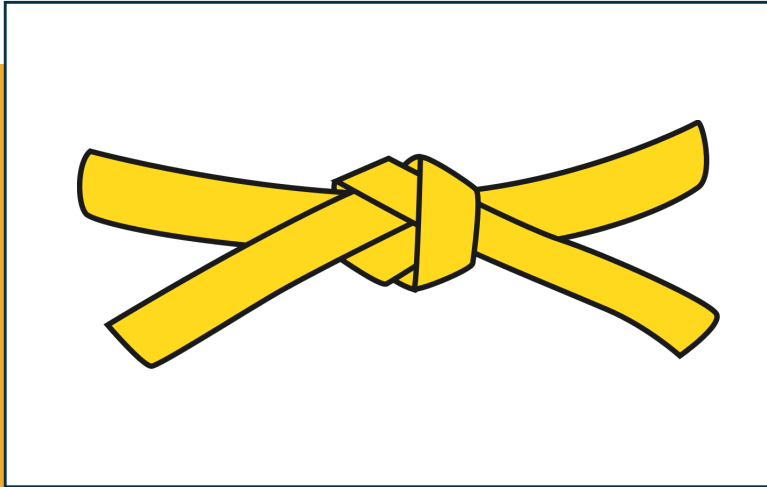


GREEN BELT

Green Belts are practitioners of Lean Six Sigma improvement and lead small/medium projects or support larger Black Belt Projects.

- Approx 1 Green Belt for every 10-30 employees (5%)
- Involved approx 50% time on projects
- Typically works projects within their functional area
- Team members for larger projects
- Team leaders for small / medium projects





YELLOW BELT

Yellow Belts are Workers and Functional Specialists and apply the Lean Six Sigma Methodology to their own work and serve on project teams on a part-time basis.

- As many as possible (target is 100% of workers)
- Functional workers, Subject Matter Specialists. Team members
- Provide support to Black Belts and Green Belts as needed
- Team members on project teams
- Supporting projects with process knowledge and data collection





What is

Lean & Six Sigma?



LEAN & SIX SIGMA TIMELINE



Guinness
Brewery



Walter
Shewhart
Introduces SPC
Statistical Process Control



W. Edwards Deming
Joseph Juran

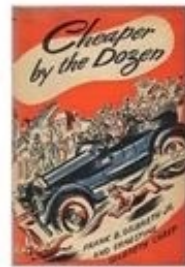
1900

1930

1950



Ford
Assembly Line



Gilbreth,
•Management
Theory
•Industrial
Engineering



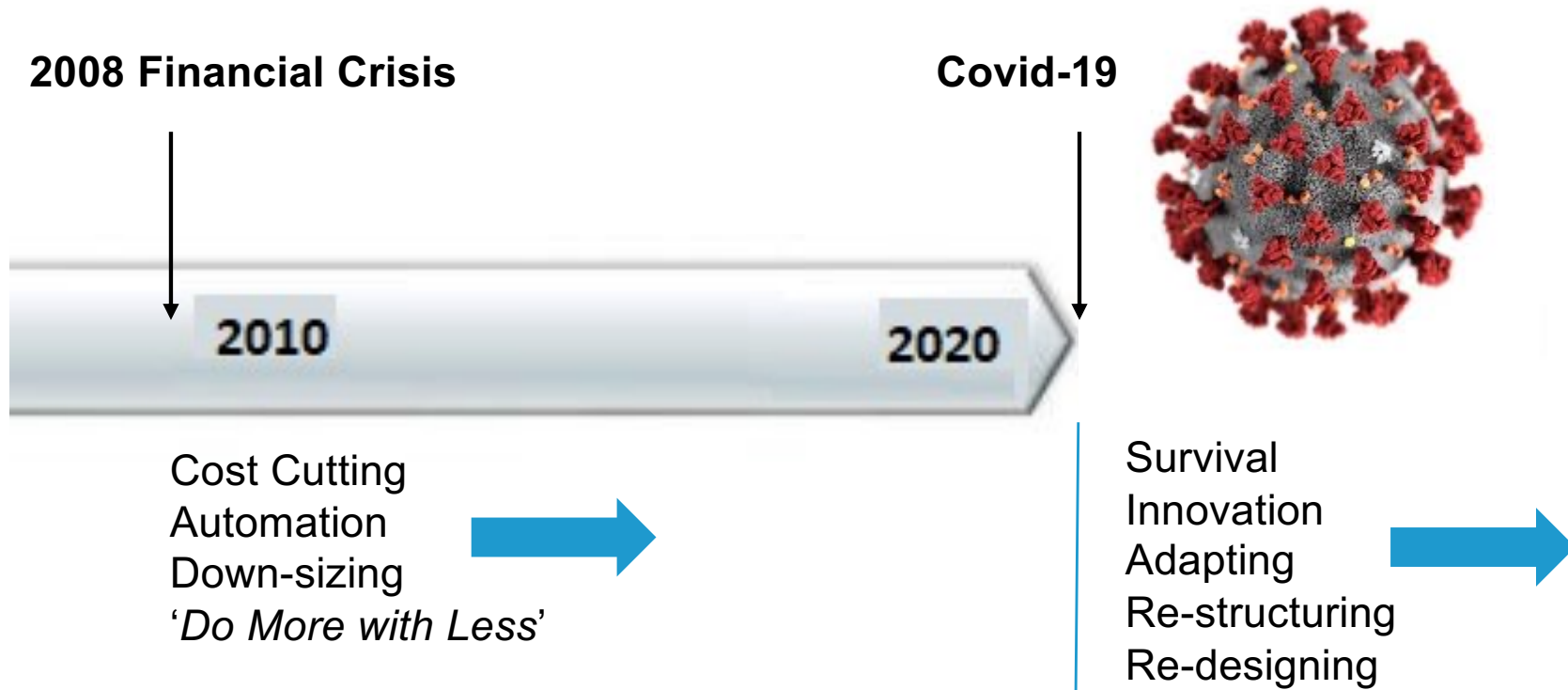
Toyota Production
System
Taiichi Ohno
Shigeo Shingo
Kaoru Ishikawa

LEAN & SIX SIGMA TIMELINE



LEAN & SIX SIGMA TIMELINE

Shift in Focus





Walter Shewhart
(SPC and Control Charts)



W. Edwards Deming
(Quality Management
PDCA Plan, Do, Check, Act)



Shigeo Shingo
SMED, Poka Yoke



Lillian Gilbreth
Process Flow
Ergonomics



Joseph Juran
(Quality Planning, Quality
Improvement
Quality Control)



Taiichi Ohno
7-Wastes, Gemba-Walk



Kaoru Ishikawa
7-Quality Tools



INFLUENTIAL LEADERS

IN LEAN & SIX SIGMA PRINCIPLES

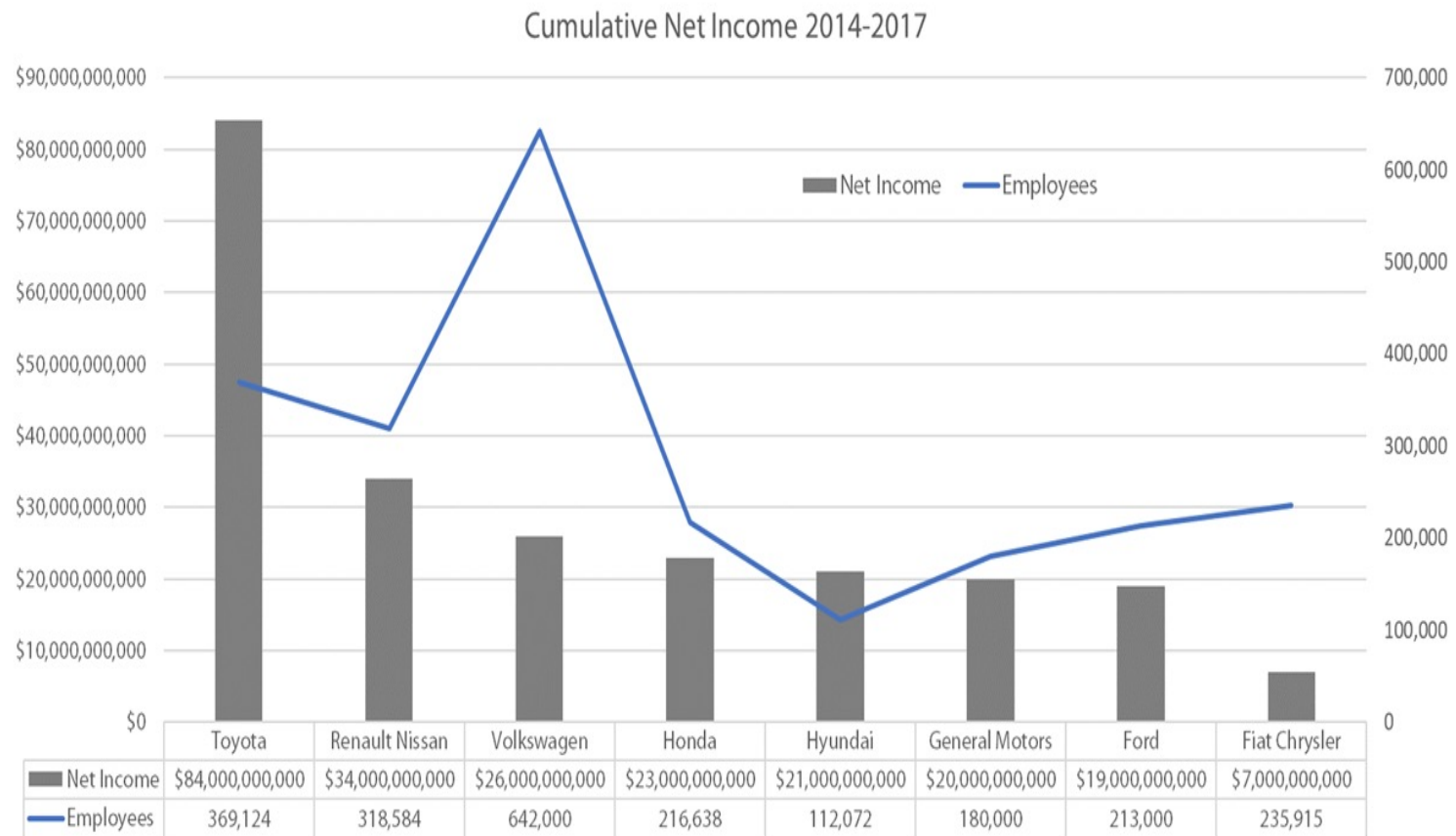
The evolution of Lean & Six Sigma was heavily influenced by American and Japanese engineers, statisticians and quality control experts 1950-1980.

Toyota Production System (TPS)

HOUSE OF LEAN



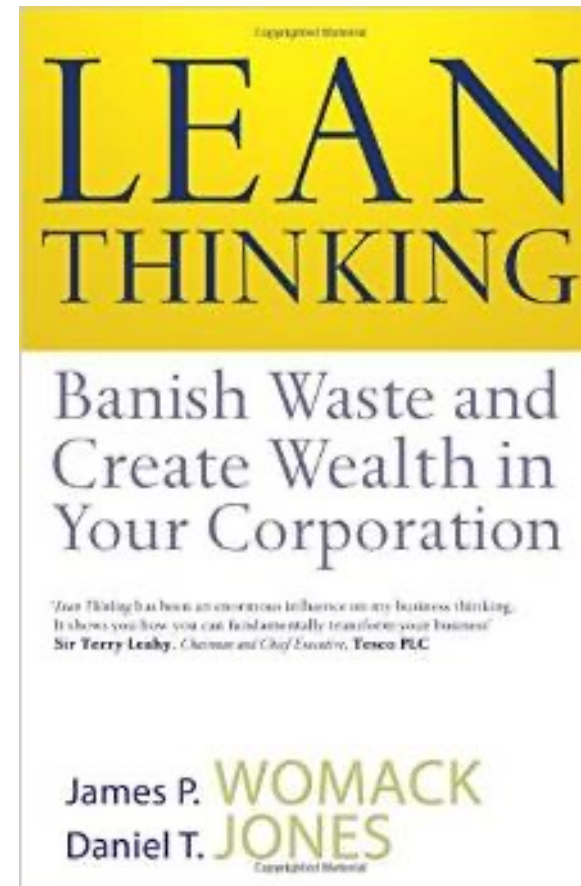
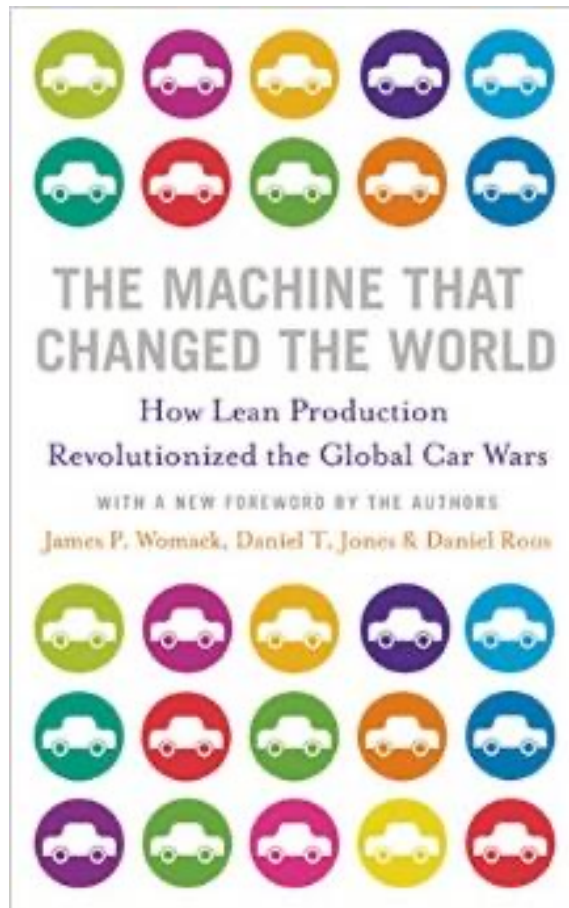
Superiority of the Toyota Production System



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Data Source: Yahoo Finance

“The Machine that Changed the World” 1990



“Lean Thinking” (1993)

Historical Phases in Manufacturing & “Lean Principles” Applied Outside of Toyota

	When	What	Examples
Craft Production	Before 1900s	Individual pieces made by experts	Everyone
Mass Production	1910 – 1980s	Large volumes of standard product made in specialized processes	FORD
Lean Manufacturing	1970s – 1990s	Small batches with pull, approaching “1-pc flow”	Japanese companies, Intro to US
Lean Operations	2000s – Future	Manufacturing companies and Non-manufacturing companies improving operations using Lean principles	Banking, Insurance, Manufacturing
Lean Enterprise	2000 – Future	Operations, Design Engineering, Marketing, Sales, and support processes fully integrated	Everyone  TOYOTA

ORIGINS OF SIX SIGMA

MOTOROLA & GENERAL ELECTRIC (GE)



**Bob Galvin: CEO of
Motorola 1980's**



1985 Bill Smith coins
the term "Six sigma"



1987 Motorola trademarks
the term "Six Sigma"

ORIGINS OF SIX SIGMA

MOTOROLA & GENERAL ELECTRIC (GE)



Jack Welch : CEO of GE 1981-2001

Jack Welch (CEO) made Six Sigma the management and corporate culture of General Electric 1981 – 2001.

- Every manager was trained as at least a Green Belt level.
- During his tenure at GE, the company's value rose 4,000%.

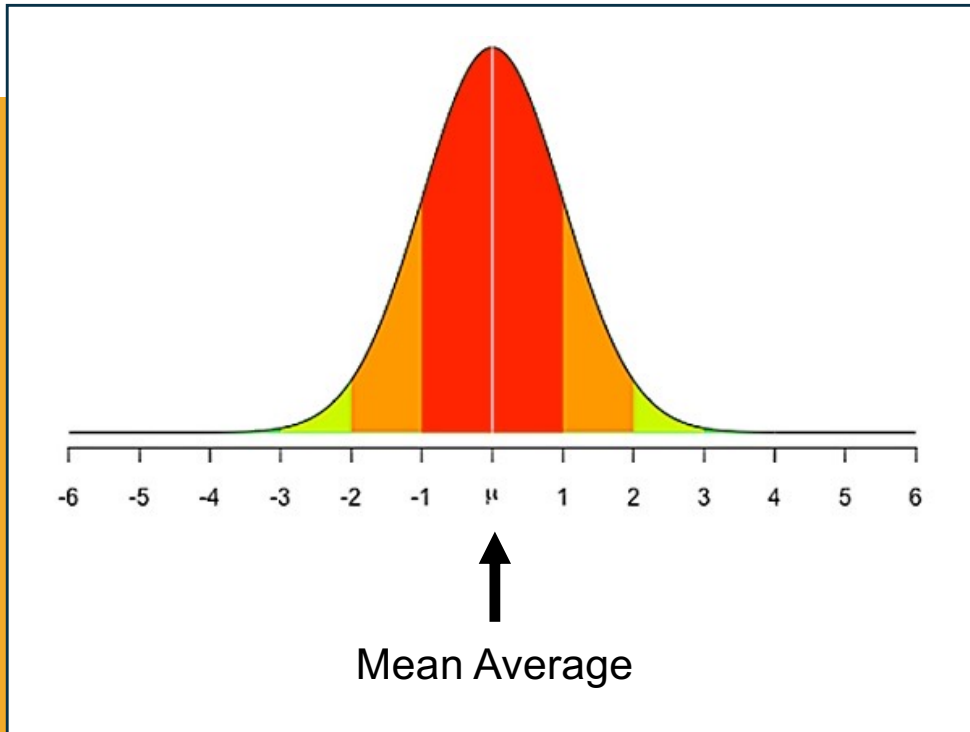
WHY IS IT CALLED SIX SIGMA?

σ , sigma

‘Sigma’ is a Greek Symbol to signify the mathematical concept called Standard Deviation. This is an important measure of Variation in a process.

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (X_i - \mu)^2}{N}}$$

You don't need to remember or even understand this equation...Its just 'behind the scenes'!!



SIX SIGMA

Six Sigma refers to a process having 6 Standard Deviations (Sigmas) between the mean average of the process (center) and the closest customer specification limit.

***LSL = Lower Specification Limit**

***USL = Upper Specification Limit**



DEFECTS VS PROCESS SIGMA LEVEL



Process Sigma Level	Defects per Million Opportunities (DPMO)
1	691,500
2	308,500
3	66,800
4	6,200
5	233
6	3.4

DEFINITION :

A “Six Sigma Process” is one that produces no more Than 3.4 defects per million opportunities for defects

3.4 DPMO

A “Six Sigma Process” is often described one that produces no more than **3.4 Defects Per Million Opportunities for defects**

3.4 DPMO (Defects Per Million Opportunities)

0.00034 % Defects

99.99966 % Correct

WHAT DOES A 0.1% DEFECT RATE LOOK LIKE?

What is 99.9% Quality?
...Or 0.1 % Defects?

- 1 unsafe plane landing per day at JFK International Airport
- 100 wrong drug prescriptions per day in US
- 10,000 Houses without electric / day in US
- 100,000 wrong bank transfers per day
- 1 million e-mails sent incorrectly per day

This is why we need Six Sigma processes!



LEAN

PRINCIPLES

1. Understand the **Value** in the product or service
2. Identify the **Value Stream** in each product or service
3. Make the product or service **Flow**
4. **Pull** value from the downstream (just in time delivery)
5. Continuous Improvement towards **Perfection**
6. Involve workers and **Respect Workers** opinions

NOTE: Only the first 5 Lean Principles were taught.
Many books and videos still refer to the '5 Lean Principles'

**Source: Lean Thinking by James P. Womack and Daniel T. Jones*

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SIX SIGMA

PRINCIPLES

1. **Reduce Variation** and you will reduce Defects / Errors
2. **Root Cause Analysis** of problems
3. **Use Data** for Decision making (instead of guessing!)
4. Use of **Statistical Analysis** tools and charts
5. Process **Optimization** using Designed Experiments and Regression Analysis, Predictive Modelling. Hypothesis Tests
6. Improvement projects using the **DMAIC** Framework

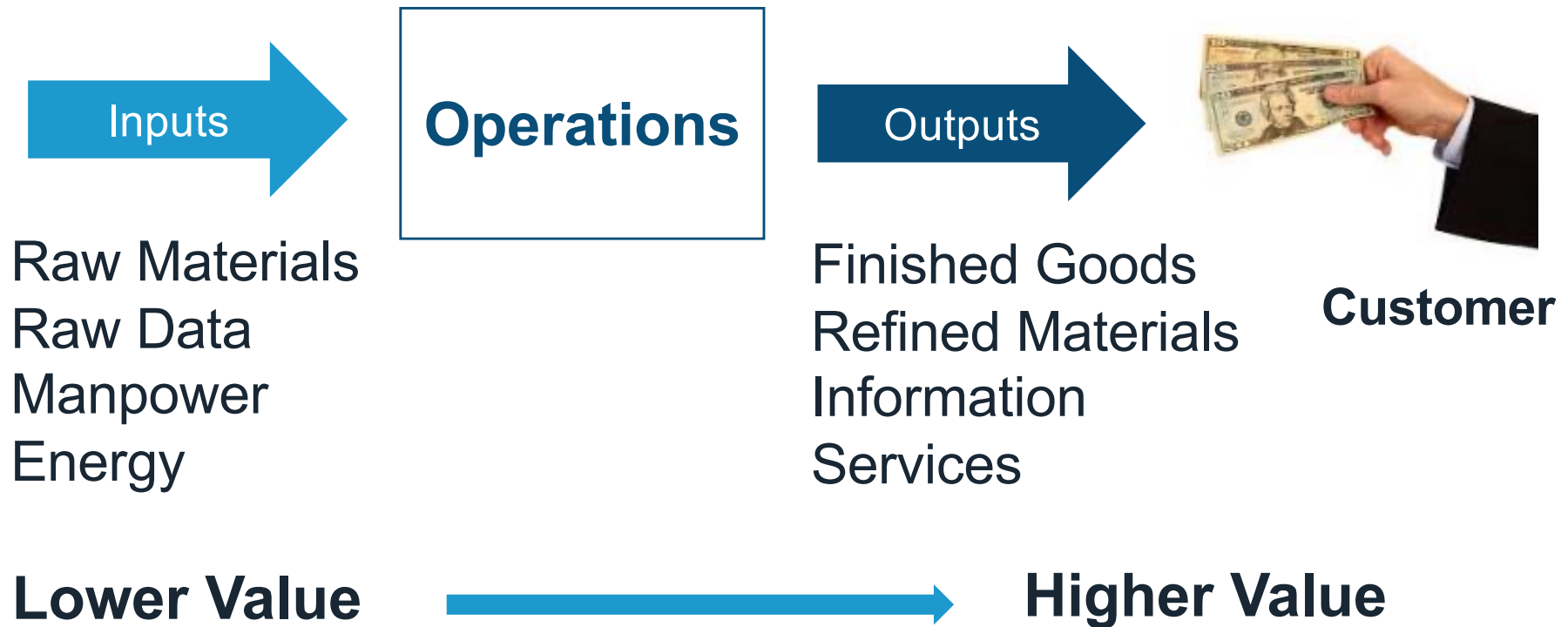


We Use Lean & Six Sigma For
Process Improvement



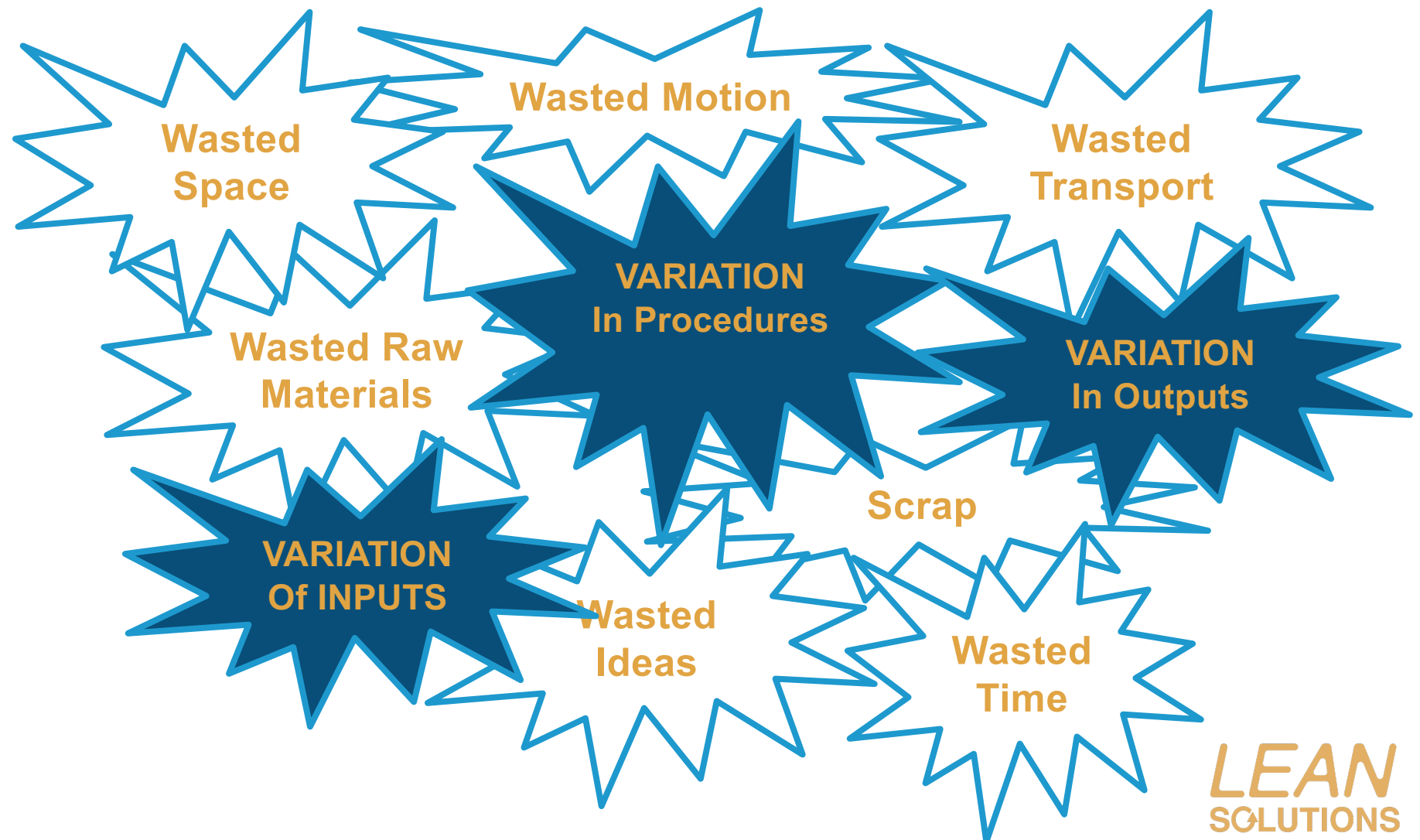
Increase Value

Traditional View of Our Processes



Waste & Variation

What Our Processes Actually Look Like



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3-STAR MANUFACTURING INC.

What are the possible Defects?

- Shapes
- Colors
- Size
- Concentric

What Defect Rate is acceptable?





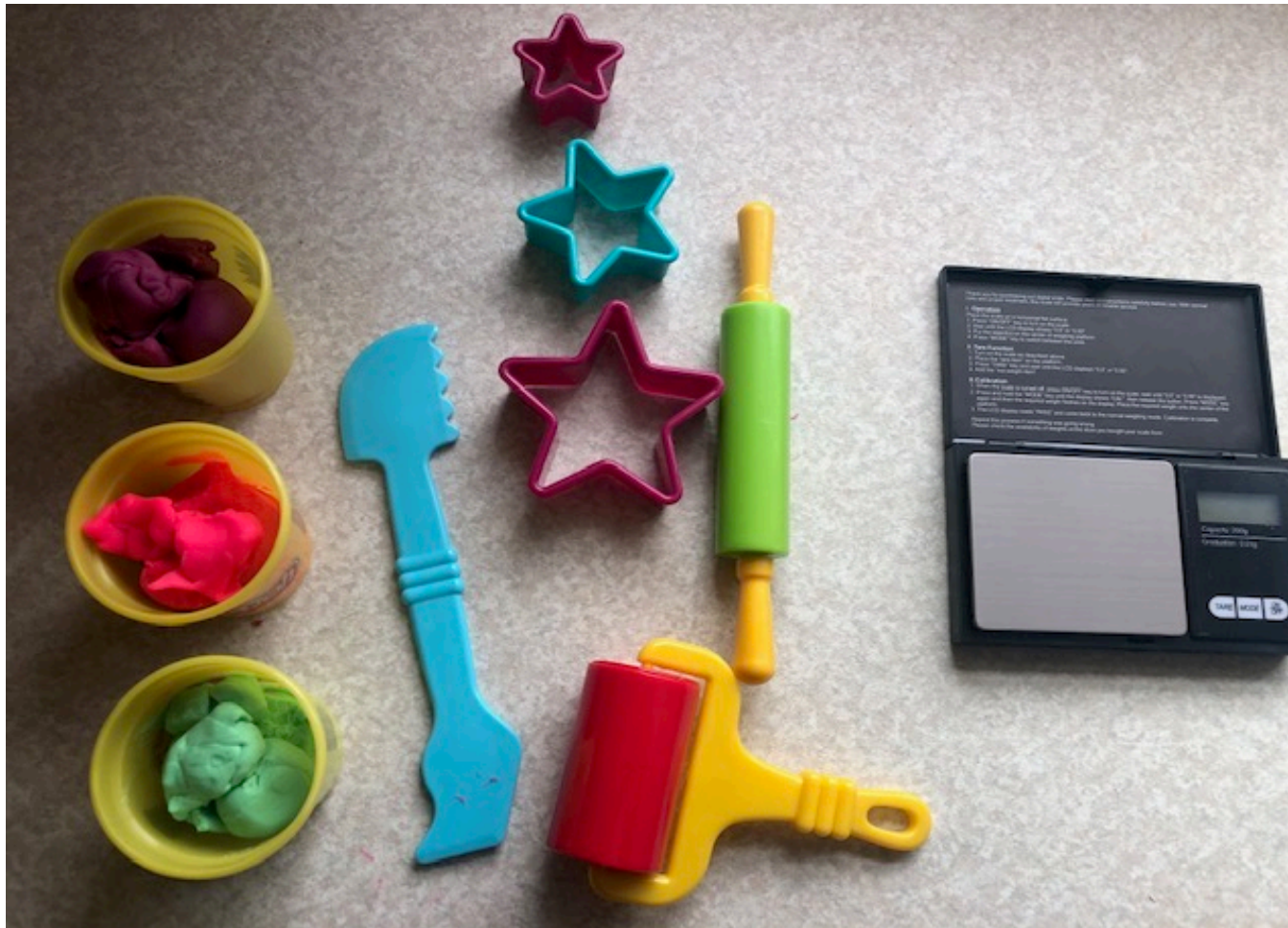
3-STAR MANUFACTURING INC.

PERFECT FOR CAKE DECORATIONS

- 3 Shapes
- 3 different Colors
- 3 different Sizes
- Concentric Shapes
- Target Weight = 10 grams
- Upper Specification Limit = 12 grams
- Lower Specification Limit = 8 grams



3-Star Manufacturing Inc.



3-Star Manufacturing Inc.

ROLL → WEIGH → FLATTEN → CUT → ASSEMBLE → WEIGH



Roll Ball

Small : 8 to 12 grams Target = 10 grams

Medium : 13 to 17 grams Target = 15 grams

Large : 18 to 22 grams Target = 20 grams

3-Star Manufacturing Inc.

Perfect for Cake Decorations

- **3 Shapes**
- **3 different Colors**
- **3 different Sizes**
- **Concentric Shapes**
- **Target Weight = 10 grams**
- **Upper Specification Limit = 12 grams**
- **Lower Specification Limit = 8 grams**





INPUTS

What do we need to create Value for Customers ?

Hint : **The '4 M' rule**

M A T E R I A L S

M A N P O W E R

M A C H I N E S

M E T H O D



INPUTS

What do we need to create Value?

Examples of Inputs in your work (Which 'M' is it ?) :

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

OPERATIONS

Transforming the Inputs into Outputs



Examples of Operations at your company :

1. _____
2. _____
3. _____
4. _____



OUTPUTS

What Your Customer Wants

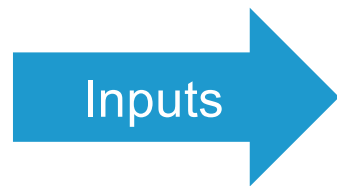
The '**TOP 5**' Outputs at your company :

1. _____
2. _____
3. _____
4. _____
5. _____

Increase Value



Lower Value  Higher Value



**Our
Business
Process**



Customer

- Safer
- Easier
- Better Quality (less defects & rework)
- Faster (on time)
- Lower Cost

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Shigeo Shingo

*'There are four purposes of improvement: **easier, better, faster, and cheaper.** These four goals appear in order of priority. Hence the first is to make the work easier for workers while improving the fruits of their labour.'*

'Intensifying the work should never be undertaken even if the same working hours are maintained.'

Non-Stock Production : The Shingo System of Continuous Improvement', (1988)

Shigeo Shingo was a primary architect in the development of the Toyota Production System.

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SQCD

1. Easier and Safer for workers (S)
2. Produce Better Quality Outputs for customers (Q)
3. Lower the Cost of Production (C)
4. Deliver the Outputs on Time (D)

The SQCD model of Production

SUMMARY

At This Point You Should Be Able To...

- Describe the defined roles of Lean & Six Sigma belts
- Describe the goals of our Process Improvement
- Understand the origins of Lean & Six Sigma
- Describe the principles of Lean
- Describe the principles of Six Sigma

QUIZ 1:



1. What was the name of the first company to use the name 'SIX SIGMA' to describe its Quality Management System?
 - **MOTOROLA**
2. What is the First Principle of Lean production ? What is the most important thing that a Lean process must produce?
 - **VALUE** (for the customer of the process)
3. Which Japanese company is considered as being the first to use true 'Lean Production "effectively and successfully" '?
 - **TOYOTA**
4. A basic principle of Six Sigma is to always find the true original source of a defect or problem. This is called _____?
 - **ROOT CAUSE ANALYSIS**
5. A "Six Sigma Process" is often described one that produces no more than 3.4 DPMO What does DPMO stand for?
 - **DEFECTS PER MILLION OPPORTUNITES FOR DEFECTS**

QUIZ 1:



6. What is the role of a Yellow Belt on a Lean Six Sigma project?
 - **A YELLOW BELT IS A TEAM MEMBER WHO ASSISTS A GREEN OR BLACK BELT, USING THEIR KNOWLEDGE OF THE PROCESS THAT THEY CURRENTLY ARE WORKING WITHIN.**

7. What is the role of a Green Belt in an organization ?
 - **A GREEN BELT IS A PROJECT TEAM LEADER FOR SMALL AND MEDIUM SIZED PROCESS IMPROVEMENT PROJECTS.**

8. What is the role of a Black Belt in an organization ?
 - **A BLACK BELT IS A PROJECT TEAM LEADER FOR LARGE PROBLEM SOLVING / IMPROVEMENT PROJECTS or OVERSEES THE WORK OF GREEN BELTS FOR MULTIPLE PROJECTS. A BLACK BELT IS A FULL TIME PROBLEM SOLVER FOR THE ORGANIZATION.**



STANDARD WORK

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ONE OF FOUR

RULES OF TOYOTA

All work shall be highly specified
as to content, sequence, timing
and outcome.



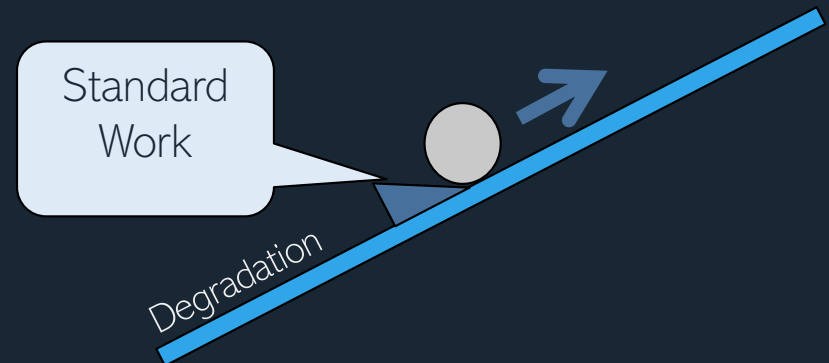


WHAT IS STANDARD WORK

- Detailed work sequence of the operator
- Provides a routine for consistency of an operation
- Details the best process we currently know
- Is the basis for improvement by defining the normal

WHY STANDARD WORK?

- o Prevents backsliding
- o Makes problems obvious
- o Removes ambiguity
- o Makes managing schedules/resources easier
- o Agree to work together/agree to change together



STANDARD WORK DOCUMENT

Work Instructions										
 PATRICK ADAMS CONSULTING		NO.	REV.	Part Number	Part Name	Quantity / Shift	Takt Time	Date	Completed By	Approved By
No.	Work Element				<u>Layout / Pictures</u>					
1										
2										
3										
4										
5										
6										
7										
8										
9										



AUDITING STANDARD WORK

AUDIT PURPOSE

- o Check understanding of the standard
- o Discover individual difficulties
 - o Did lack of training lead to the problem
 - o Kaizen: to take away difficulty
- o Identify waste in process

Standard Work audits are NOT meant to be punitive





WHY AUDIT STANDARD WORK?

- o Go to Gemba
- o Establish standards if not in place
- o Kaizen day after day, even the small things
- o Kaizen creates basis for larger change
- o Developing people
- o Encourage team work

STANDARD WORK

AUDIT AGENDA



Member trained & documented?



Work area layout correct?



Work in progress within allowance?



Step sequence followed?



Within time?



Results discussed with member?



What to do if someone is not following the standard?

ASK WHY

They're not following the standard

RESPOND TO

The reason they indicate



STANDARD

WORK SUMMARY



Every facility must implement and maintain Standard Work



Applying Standard Work demonstrates how methods to improve quality, increase operational speed, and reduce costs are all interconnected



Standardized Work establishes the foundation for all productivity, quality, safety, and cost improvements of the future



STANDARD

WORK SUMMARY

- Standard Work - The BEST combination of people and machines (assets) while using the minimum amount of materials, equipment and space
- We need to test out possible improvements by changing only one thing at a time.
- Standard work should be developed by those who perform the tasks. The operators that do the work are most likely to know how to do it well and are the experts.



VALUE & WASTE

Lean focuses on identifying which activities add value, and which do not...

Value Added Activity

- Transforms or shapes (for the 1st time) material or information to meet customer requirements
- Anything the customer is willing to pay for ONE TIME ONLY

Non-Value Added Activity (Waste)

- Anything else that consumes resources or is related to rework or scrap

Incidental Non-Value

- Serves you or the company but the customer doesn't value it

WHAT DO YOU WANT TO PAY FOR?

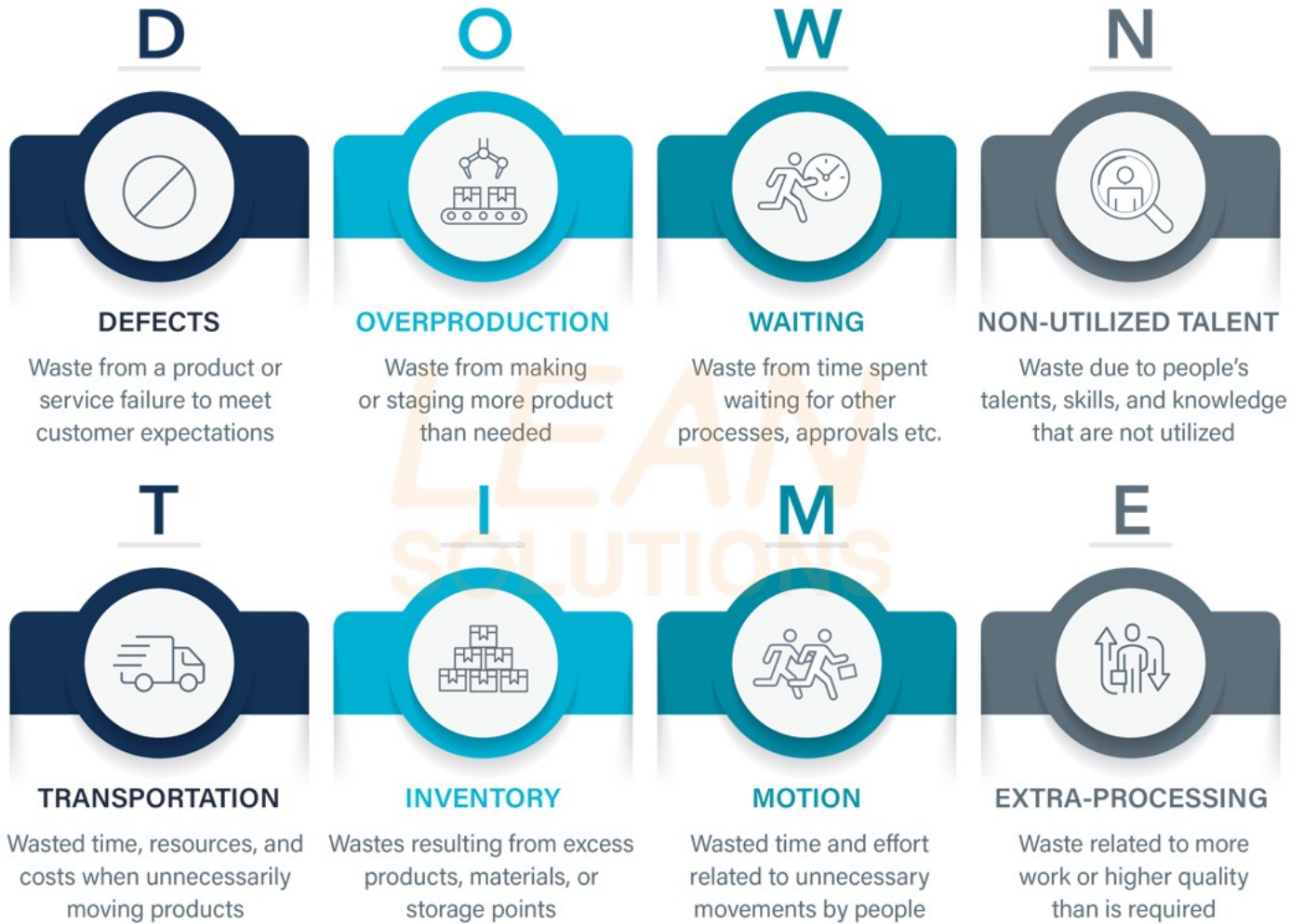
If you were the patient, what would you be willing to pay for?

Value Added steps are those the customer is willing to pay for – all else is a form of Non-Value Added or Waste.

Doctor Visit	
Making appointment	10 min
Driving to the doctor's office	30 min
Filling out insurance and health history forms	10 min
Waiting in the reception area	20 min
Walking to the vitals room	2 min
Nurse taking your blood pressure and weight	4 min
Walking to the exam room	2 min
Waiting in the exam room for the doctor	15 min
Exam by doctor	15 min
Checking out at the front desk	3 min
Driving home	30 min
TOTAL 141 min	

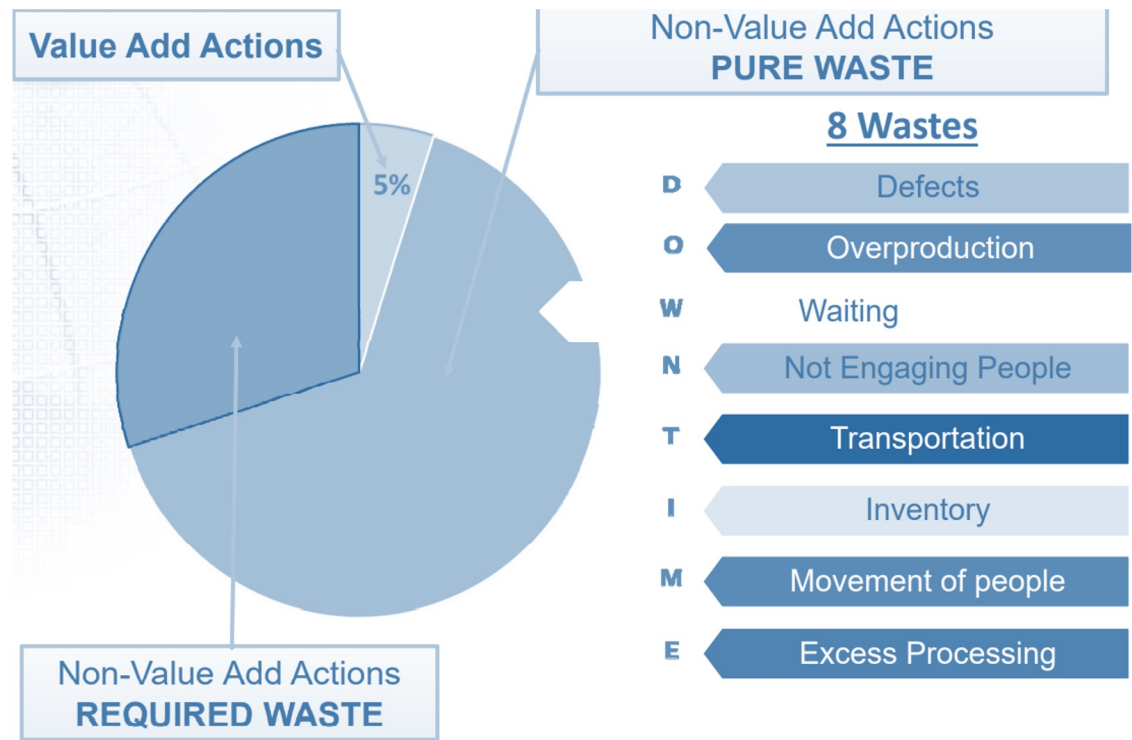


Recognizing Waste





CATEGORIES OF ACTION



FBI WARNING

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WASTE WALK

A planned visit to where work is being performed to observe what's happening and to note the waste.

- Explain to the people in the area of observation what you are doing
- Study the area for 20-30 minutes
- As you see work that appears to be waste, jot down the example you see
- Take action immediately if possible or develop a plan to remove waste

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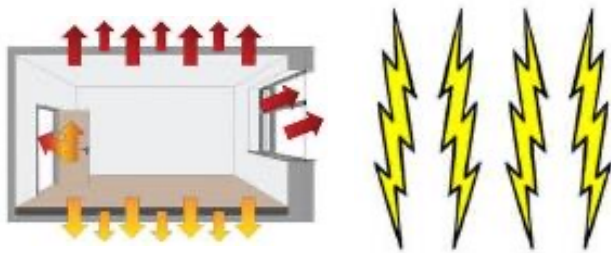
Waste Walk Form

Date: XX/XX/XX
 Location/Area: Main Production
 Observer: Craig T.



Type of Waste	Definition	Observations
Defect/Rework	Product that does not meet customer requirements	Excessive amount of Hoods in Repair Bay, 4 Racks at 20 per rack
OverProduction	Producing more than is required	There are 35 Left Hand Rockers but only 7 Right Hand Rockers. These ship as sets of one each
Waiting	Delays in the process, waiting for next step to occur	Paint Line is Full of parts waiting to be loaded
Non-Utilization of Talent and/or Resources	Not utilizing people's skills properly	Lay up operators are being used to hang parts on the paint line
Transportation	Unnecessary movement of material from one location to another	Material Handler is required to move parts from lay-up, to bonding, to sanding, and to paint.
Inventory	More supplies/equipment than required to service customer	275 Hood outer panels are held at bonding
Motion	Movement that does not add value to the work being completed	Left and Right Hinges are removed from boxes and put in Totes to be staged at bonding cell
Excess-Processing	More work is done than required by the customer, or things are made more complicated than necessary	Hood outer panel is getting sanded in areas that are no longer used to bond to inner panel

'Non-Traditional' Categories of Waste



Utility/Energy (Heat/Electrical) Losses



Miscommunications



Over - Communications



Skilled Staff Losses

3-Star Manufacturing Inc.



Where is the **Waste**?

ROLL → WEIGH → FLATTEN → CUT → ASSEMBLE → WEIGH



QUIZ 2 :



1. All work shall be highly specified as to content, sequence, timing and _____.
 - **OUTCOME**
2. True or False? Standard work provides a routine for consistency of an operation.
 - **TRUE**
3. True or False? Standard work helps to hide problems.
 - **FALSE**
4. Discussion: Why is it so important to audit standard work?

QUIZ 2 :



1. Which of the traditional 8-Wastes of 'DOWNTIME' is concerned with reducing the complexity of processes and taking out unnecessary steps or activities ?
 - **NON-ESSENTIAL PROCESSING / OVER PROCESSING**
2. What is the name of the Waste of producing more that the customer demand can absorb ?
 - **OVER-PRODUCTION**
3. What is Waste called when an activity or step in process needs to be repeated because it was not done 'Right-First-Time' ?
 - **REWORK / DEFECTS**
4. What Waste results in Queues or Backlogs of materials or work ?
 - **WAITING (DUE TO A BOTTLE-NECK IN THE PROCESS)**
5. What is the Japanese word for 'Waste' ?
 - **MUDA**

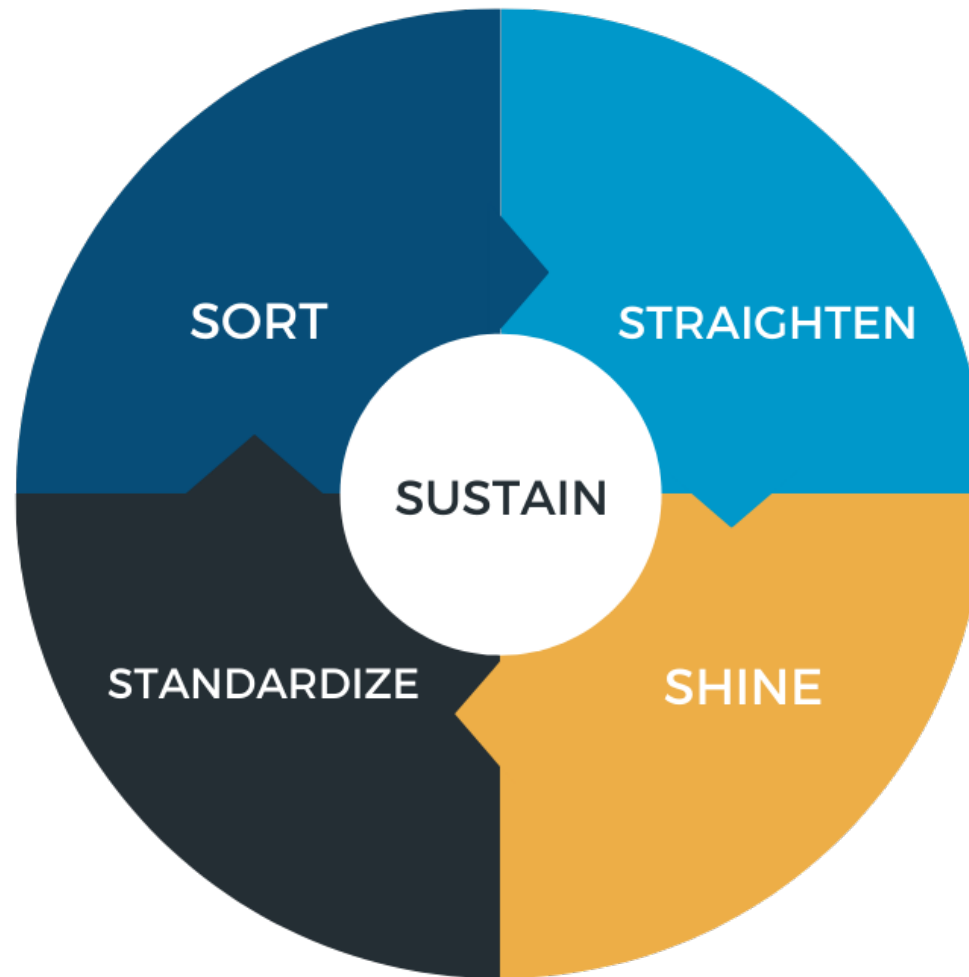


5S

Continuous Improvement
should not be just an event



5S





WHY 5S?

Workplace Organization and Visual Management should be Fundamental to Your Facility

- SAFER!
- Problems Become Visible
- Promotes Culture

Result: Improved Safety, Quality, and Cost

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FIND A FLATHEAD SCREWDRIVER



FIND A FLATHEAD SCREWDRIVER

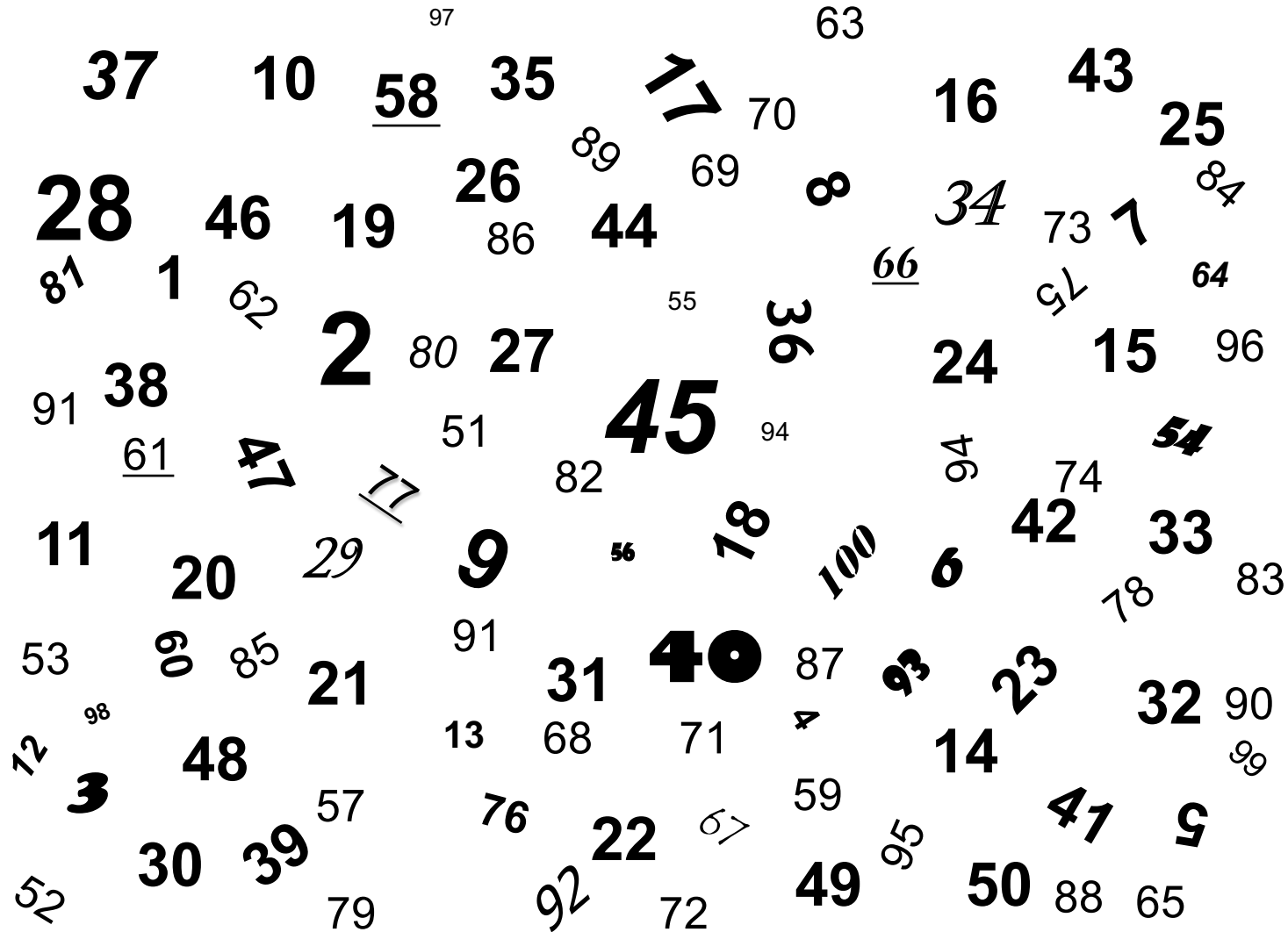




Exercise #1



60



SORT

- o Critically examine everything
- o Red Tag Process
 - o Always use-Have a place for it
 - o Sometimes use-Tag and Date
 - o Never use-Red tag area
- o Need a 6mm Hex? Keep only the 6mm Hex, not a whole set
- o Members know best what is needed
- o Everything in the area should have a purpose



5S RED TAG	
Date _____	Tagged By _____
Item Description _____	
Department _____	
ITEM TYPE:	
☐ Raw Materials	☐ Tools
☐ Finished Goods	☐ Instruments
☐ WIP	☐ Equipment
☐ Machine Parts	☐ Other _____
Other _____	
REASON TAGGED:	
☐ No Longer Used	☐ Unknown Owner
☐ Doesn't Work	☐ Other _____
Other _____	
ACTION TO TAKE:	
☐ Throw	
☐ Hold	
☐ Move to _____	
☐ Corrupt	
☐ Other _____	
Date _____ Managers Initials _____	
Tag No. _____	
www.the5Sstore.com 5S/BSP	



Exercise #2



60

37 10 35 16 43 25
28 46 19 26 44 34 1
1 2 27 45 24 15
38 7 36 18 42 33
11 20 29 9 6 40 4 32
12 21 13 31 14 23 5
3 48 49 50 47 5
30 39 22



STRAIGHTEN or SET IN ORDER

- For what's left, where does it go?
- Be mindful of frequency of use
- Be Visual
- Arrange so things are easy to find and readily retrieved.
- "A place for everything and everything in it's place."



SHINE

- oClean the area (tools, equipment, lighting, etc.)
- oRe-painting may be required
- oImplement regular housekeeping so that any dirt or grease is immediately obvious.
- oAlways use your 5S Color Standards



Exercise #3



60

1	37	10	28	46	19	26	35	17	44	8	34	16	43	25	7
11	38	2	47	20	29	9	27	36	45	18	6	24	15	42	33
3	12	39	48	30	21	13	31	40	22	4	14	23	32	41	5
										49		50			

STANDARDIZE



- o Implement Work Center 5S Board
- o Take a picture of the area
- o Assign an area owner
- o Develop standard work for regular housekeeping
- o Implement Daily End of Shift Checks

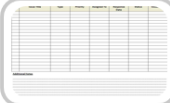




Exercise #4



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	2 nd Layer	3 rd Layer
Zone 1								
Zone 2								
Zone 3								
Zone 4								
Zone 5								
Zone 6								
Zone 7								
Standard Work								
Schedule								
Audit Sheets								
Zone Map								
Action List								

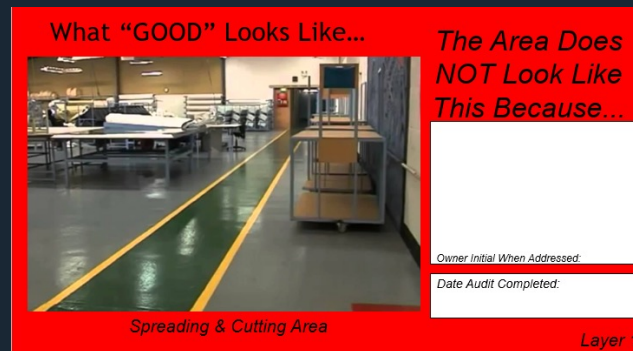
SUSTAIN

Implement Layered Process Audits
in order to sustain improvements

SUSTAIN

LAYER 1 AUDIT

- o Layer 1 audits are completed daily by team leaders based on a posted schedule
- o Area owner is responsible for any red items on Layer 1.
- o Layer 1 checks that the area matches the picture and the work center 5S board is being completed



SUSTAIN

LAYER 2 AUDIT

- o Layer 2 audits are completed by the area Supervisor one time per week.
- o The Layer 2 audits are specifically auditing the audit completion to schedule.
- o The area Supervisor is responsible for any red items in Layer 2.

What "GOOD" Looks Like...	The Area Does NOT Look Like This Because...	What "GOOD" Looks Like...	The Area Does Look Like This.
✓ The Layer 1 Audits are NOT Being Completed to the Schedule ✓ For any 'RED'; action was NOT taken per std work ✓ There are consecutive 'RED' days	Owner Initial When Addressed: Date Audit Completed:	✓ The Layer 1 Audits are Being Completed to the Schedule ✓ For any 'RED'; action was taken per std work ✓ There are not any consecutive 'RED' days	Date Audit Completed:

Layer 2

Layer 2

SUSTAIN LAYER 3 AUDIT

Layer 3 audits are completed by the Operations Manager or Plant Manager once per month.

What "Good" Looks Like...

- Y N No items present in area without designated location
- Y N Aisleways are clear and clean without obstruction
- Y N All part racks and containers labeled with proper ID
- Y N All surfaces free of dirt and dust, "Hospital Clean" standard
- Y N Records of required 5S activities are dated, initialed & current
- Y N Team has documented action items on team W3I to improve workplace organization, reduce / eliminate sources of clutter / debris

- Y N Layer 2 audits are being completed to schedule

The Area Does NOT Look Like This Because...

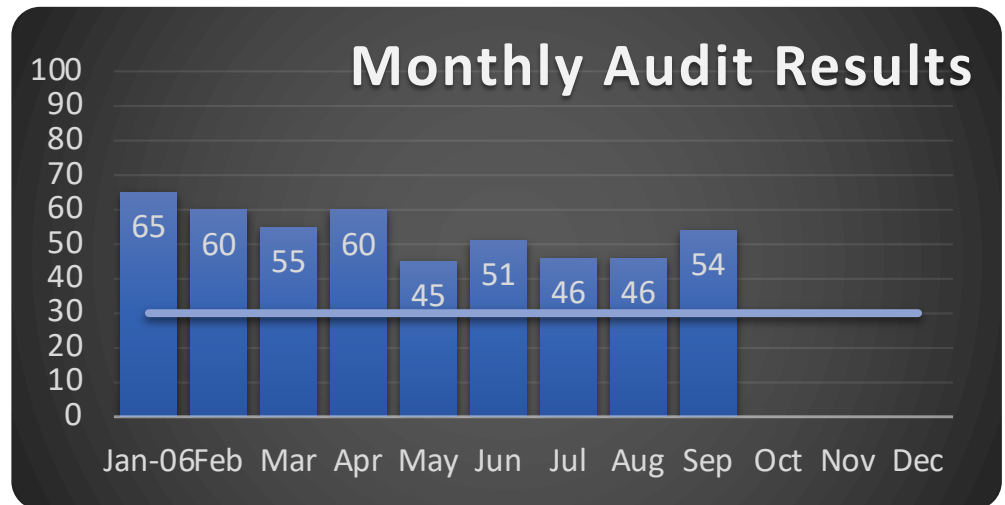
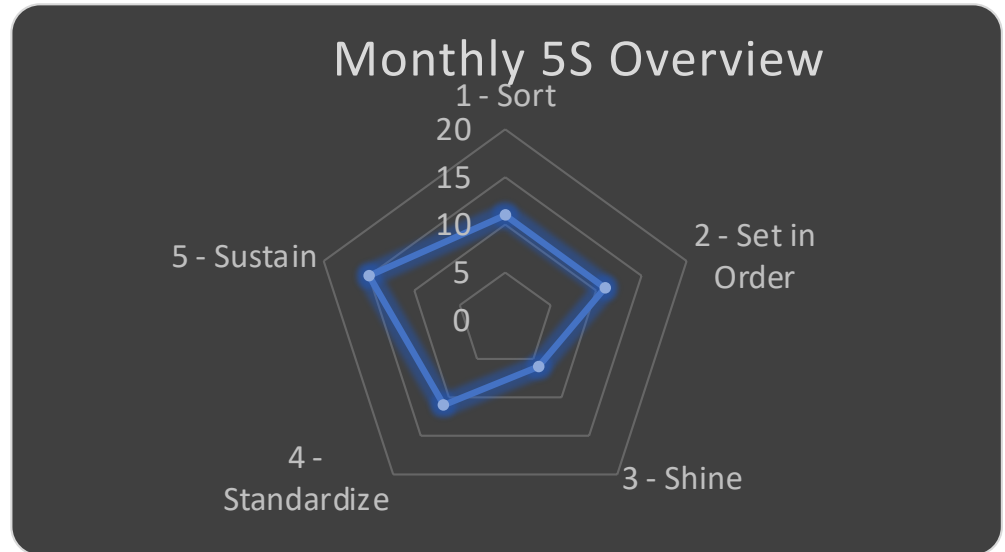
1 Action Item To Address:

Owner Initial/When Addressed:

Date Audit Completed:

5S Audit & Results

5S Workplace Scan Checklist											
Department:		Place an "x" in the appropriate box based on number of issues observed.									
Date:		Scored By:		Number of Observations >> 0 1-2 3-4 5-6 >6							
Sort	Distinguish between what is needed and not needed										
	1	Unneeded equipment, tools, furniture, etc. are present									
	2	Unneeded items are on walls, notice boards, etc.									
	3	Items are present in walkways, stairways, corners, fire exits etc.									
	4	Unneeded inventory, supplies, parts, or materials are present									
	5	Safety hazards (water, oil, chemical, machines) exist									
		Subtotal >>	0	1	4	6	0				
Set in Order	A place for everything and everything in its place										
	1	Correct places for items are not obvious									
	2	Items are not in their correct places									
	3	Walkways, workstations, equipment locations are not indicated									
	4	Items are not put away immediately after use									
	5	Height and quantity limits are not obvious									
		Subtotal >>	0	1	4	6	0				
Shine	cleaning, and looking for ways to keep it clean and organised										
	1	Floors, walls stairs, and surfaces are free of dirt, oil, and grease									
	2	Equipment is not kept clean and free of dirt, oil, and grease									
	3	Cleaning materials are not easily accessible									
	4	Lines, labels, signs, etc are not clean and unbroken									
	5	Other cleaning problems of any kind are present									
		Subtotal >>	0	2	4	0	0				
Standardize	Maintain and monitor the first three categories										
	1	Necessary information is not visible									
	2	All standards are not known and visible									
	3	Checklist don't exist for all cleaning and maintenance jobs									
	4	All quantities and limits are not easily recognizable									
	5	How many items can't be located in 30 seconds									
		Subtotal >>	0	1	4	6	0				
Sustain	Stick to the rules										
	1	How many workers understand the 5s principals									
	2	How many times last week was daily 5s not performed									
	3	Number of times that personal belongings are not neatly stored									
	4	Number of times job aids are not available or up to date									
	5	Number of times last week daily 5s inspection were not performed									
		Subtotal >>	0	1	0	6	8				
		Total >>	0	6	16	24	8				
		Grand Total 5S Score	54								



5S Your Computer Hard/Shared Drive



5S Principle	Description
Sort	• Check all your files and software, and get rid of any that are unnecessary
Set In Order	• Organize your files and optimize the use of file folders • Keep in mind how often you need them and how much time you need to store them • Create specific shortcut icons for the most used files or programs
Shine	• Eliminate any files under deleted items, sent items and the recycle bin
Standardize	• Establish procedures for maintaining your computer 5S system
Sustain	• Include hard drives in 5S audits • Focus on how people maintain files and program organization, and the time they spend doing so

5S 3-Star Manufacturing Inc.





5S IN YOUR COMPANY

DISCUSSION

- What areas of your work could do with 5S?
- Who do you need to get involved?
- When are you going to try 5S?

QUIZ 3 :



1. Which stage of the 5S method is used to ensure that the workers have the good habits and discipline to continue the other 4S tasks?
 - **SUSTAIN**

2. In 5S the action of removing unnecessary tools, equipment and materials from the workspace is called _____.
 - **SORT**

3. Cleaning the workplace of dirt, dust and litter is called what in 5S ?
 - **SHINE**

4. Give one example of a 5S method used for **SET IN ORDER / STRAIGHTEN**
 - **SHADOW BOARDS**
 - **RACKS**
 - **COLORED LABELS**
 - **FLOOR MARKING etc**



Lean Principles & Tools



6 FUNDAMENTALS OF LEAN

- o Value
- o Value Stream
- o Flow
- o Pull
- o Perfection
- o Respect for People



WHO IS YOUR CUSTOMER?

IN LEAN SIX SIGMA...

- Value is always viewed “Through the eyes of the Customer”
- Who is our customer ?
- What is The Voice of our Customer (VOC) ?
- What is Critical to Quality (CTQ) to our Customer ?



WHO IS YOUR CUSTOMER?

'Internal Customers' VS 'External Customers'

- An internal Customer could be a different department or operation. It could be the next downstream operation in the process.
- Can you name some different types of 'Internal/External Customers'?

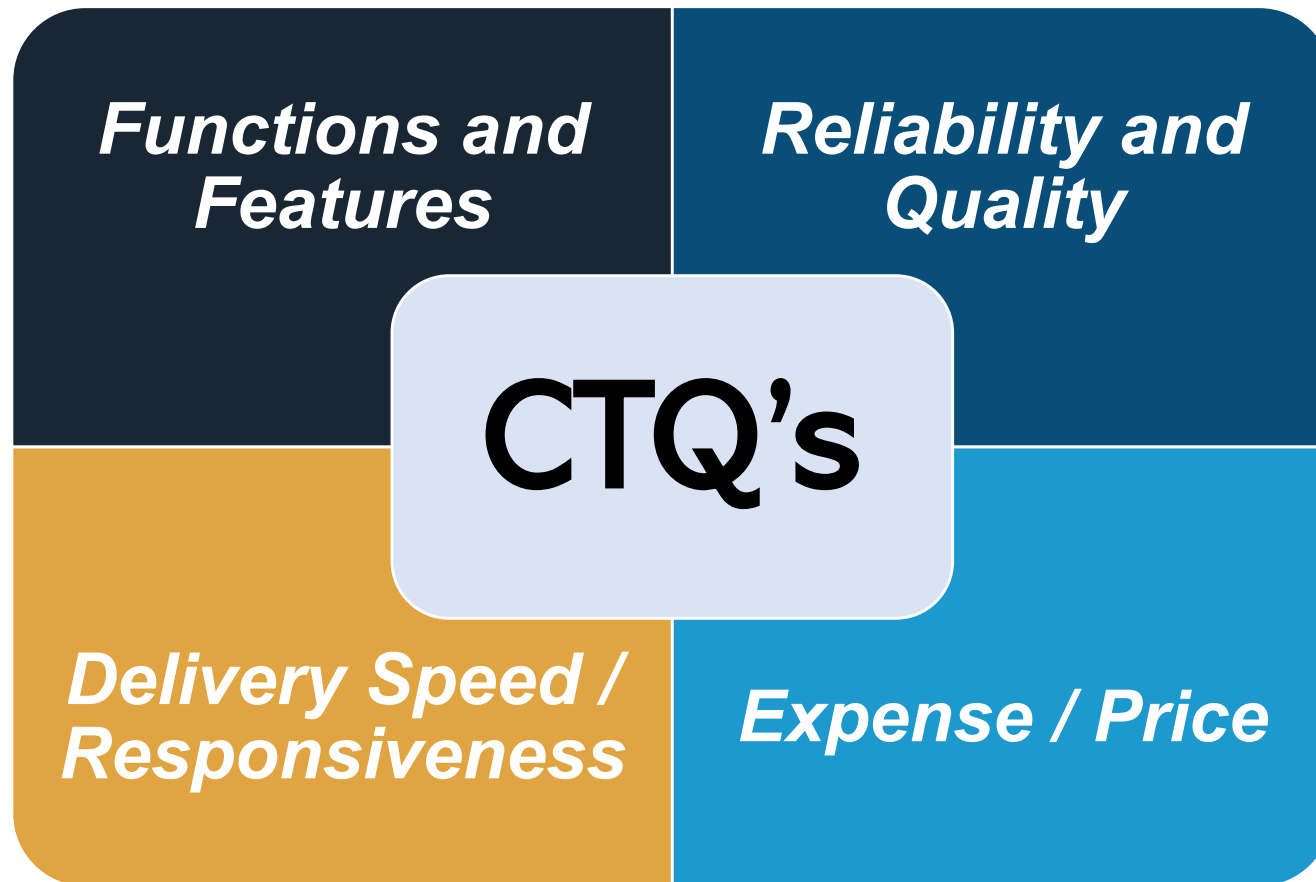
WHAT IS A CTQ?

Critical to Quality (CTQ's) are measures we use to capture VOC properly.

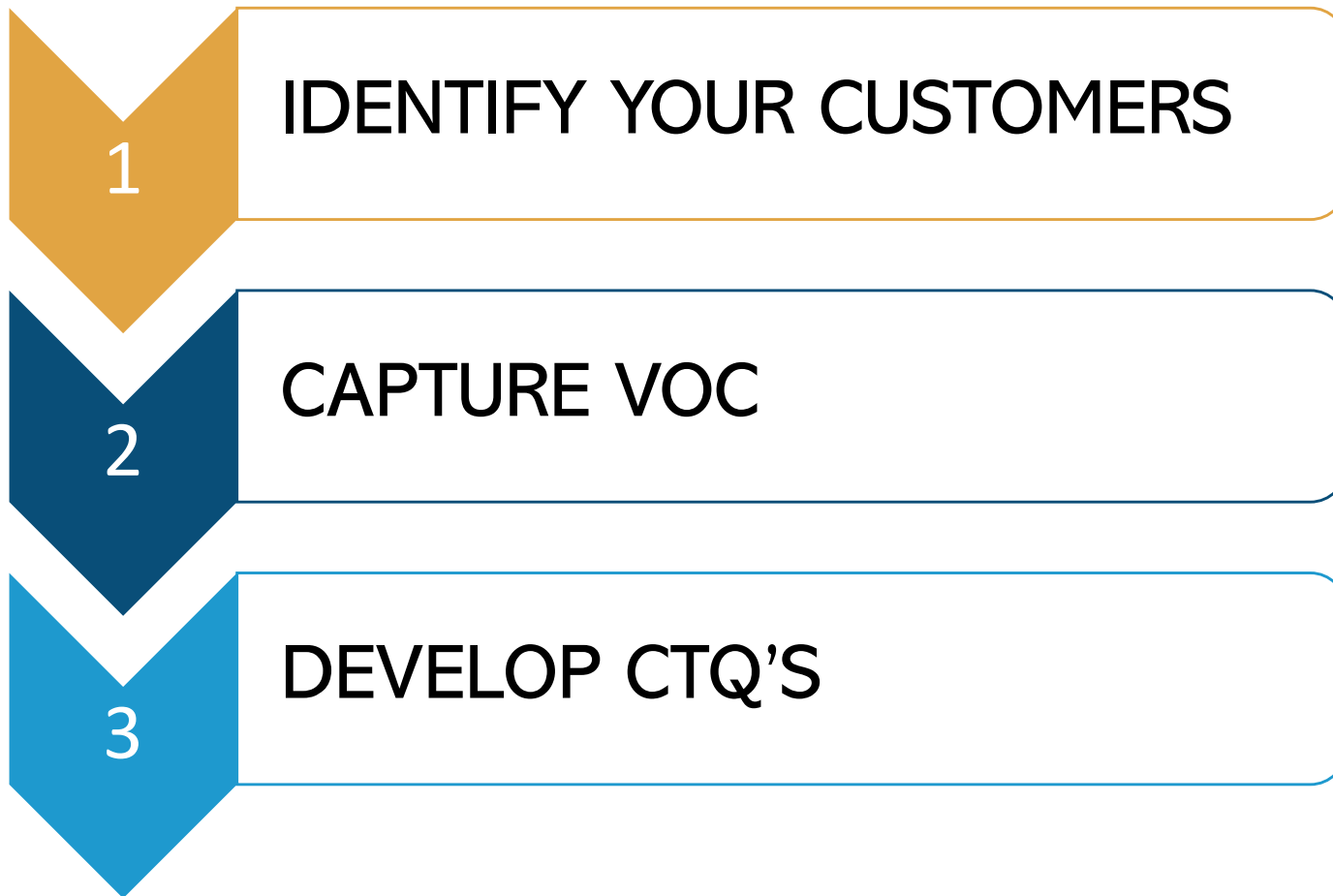
- Also referred to in some literature as :
 - CTC's – Critical to Customer
 - CTS's – Critical to Satisfaction
 - CTQC - Critical to Quality Characteristics
- CTQ's are a tool to help to break down VOC into well defined and measurable terms.

DEFINING CTQ'S

Customer CTQs usually fall into one of 4 categories :



DEVELOPING CTQ'S



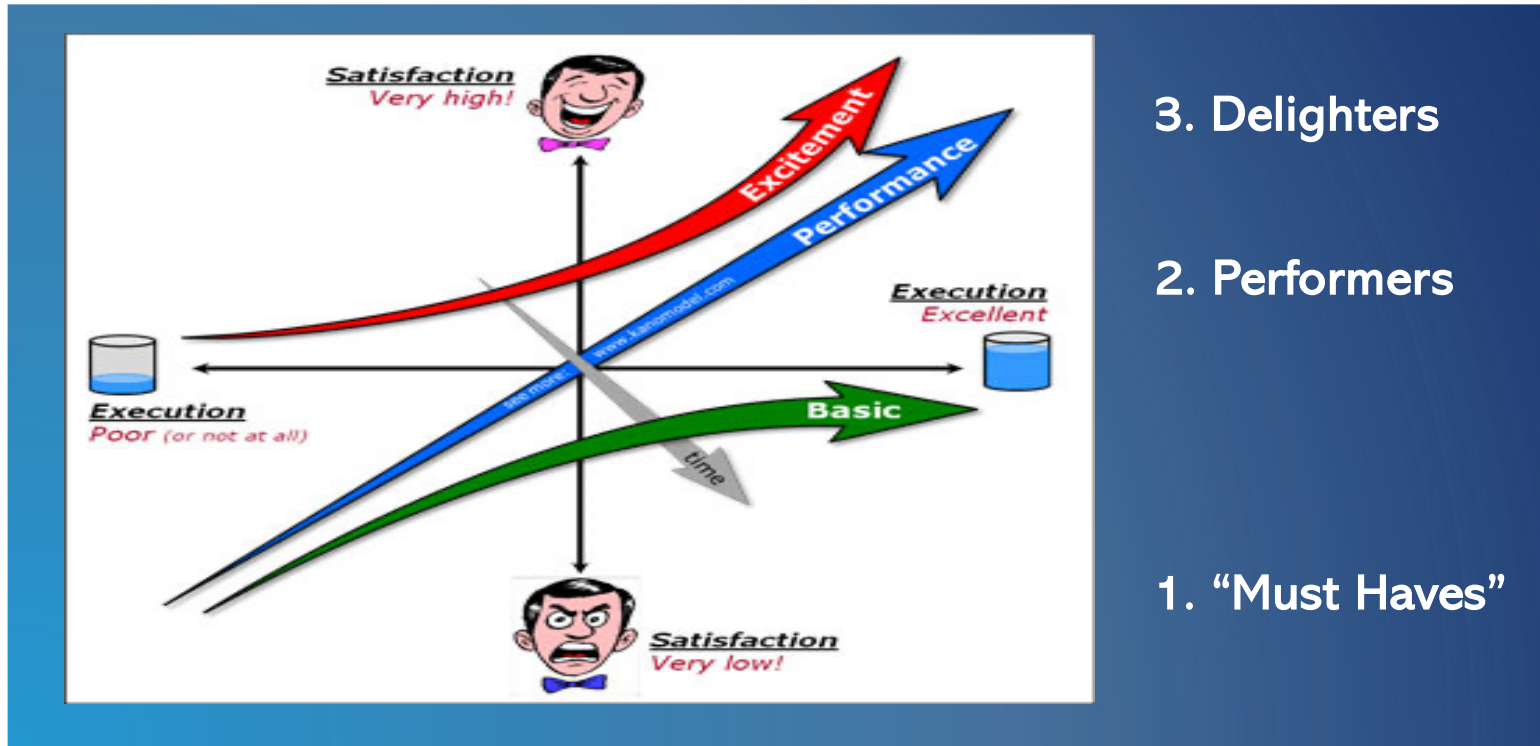
SPECIFICATION LIMITS

“Specification Limits” are Lean Six Sigma’s way of defining your customer expectations

USL = Upper Specification Limit

LSL = Lower Specification Limit

Also called ‘Tolerance limits’ in some businesses

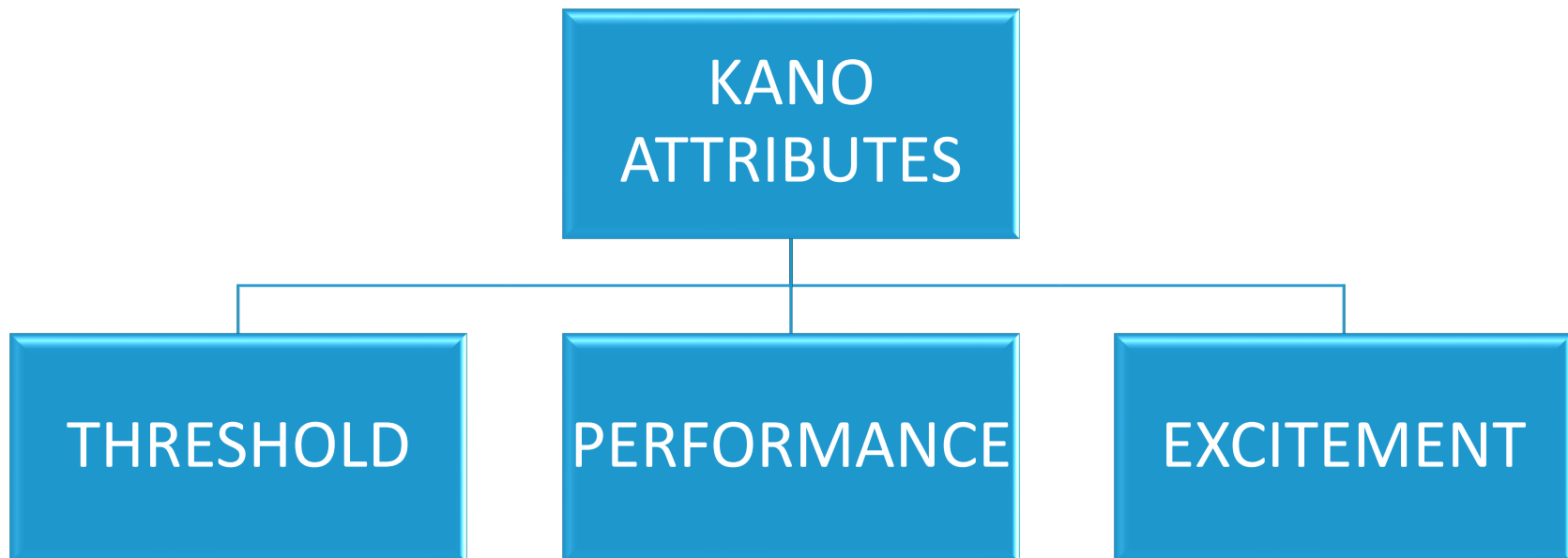


KANO ANALYSIS

Developed in the 1980s by Professor Noriaki Kano, which classifies customer preferences into three main categories

KANO ANALYSIS

The Kano Model has three main categories of attributes:





CTQ's & KANO

Consider 3-Star Manufacturing

- What are the CTQs for the process ?
- What are the Basic Requirements ?
- What are Performers ?
- What are Delighters ?



3-Star Manufacturing Inc.

CTQS: _____

- Basic Requirements

- Performers

- Delighters



Poka Yoke & Jidoka



POKA YOKE & JIDOKA

PREVENT DEFECTS

- Create no defects / errors
- Accept no defects / errors
- Pass no defects / errors

JIDOKA

- **Work** stops immediately when a problem first is detected.
- The **Root Cause** of the defect is discovered and corrected before work continues
- This prevents defects being passed on downstream
- This short term disruption to FLOW will improve both FLOW and QUALITY in the long term



POKA YOKE

Originally called Baka Yoke (Idiot Proofing) it was changed to Poka Yoke (mistake proofing) by Toyota in 1960's so as not to dishonor anyone to be labeled as an "Idiot".

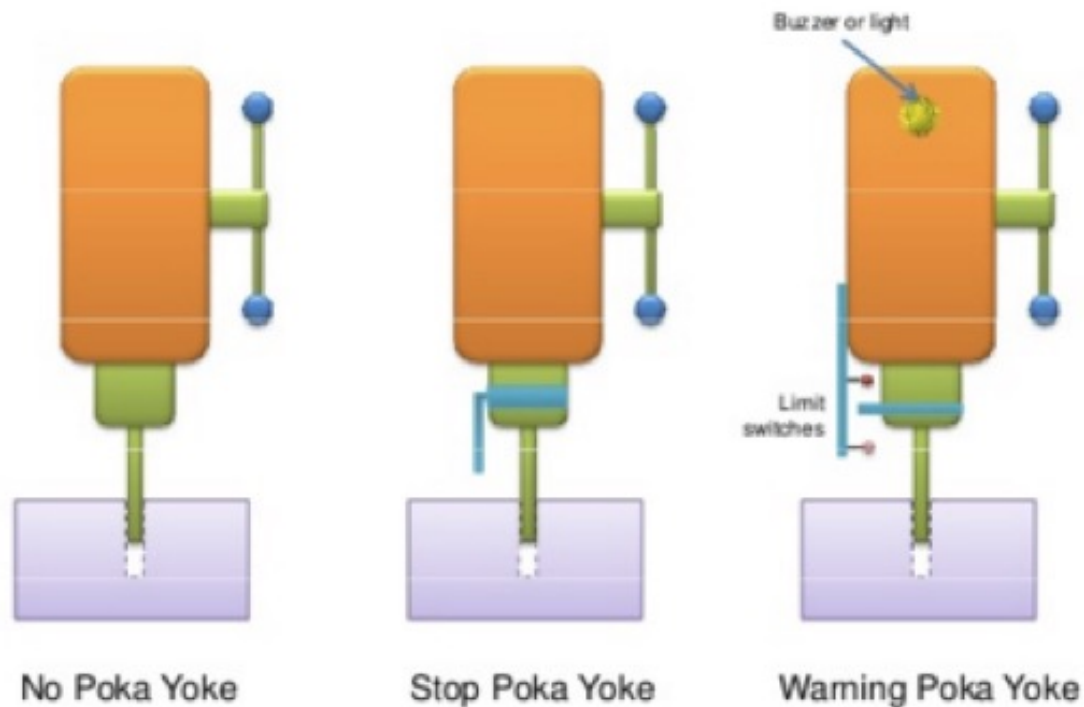
Poka Yoke = Mistake Proofing

Prevent mistakes rather than correct mistakes
Prevent defects rather than correct defects

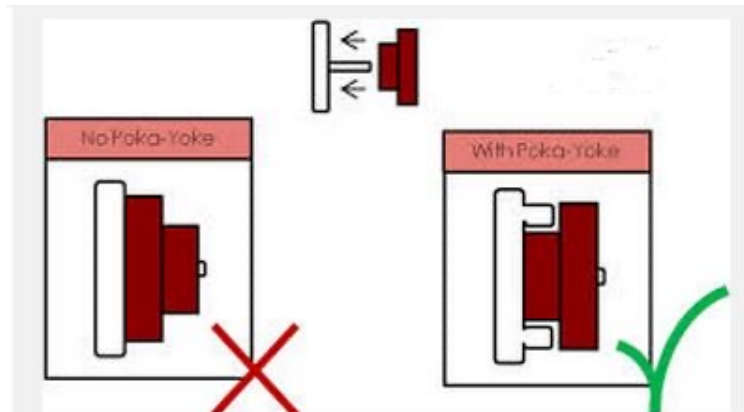


POKA YOKE EXAMPLES

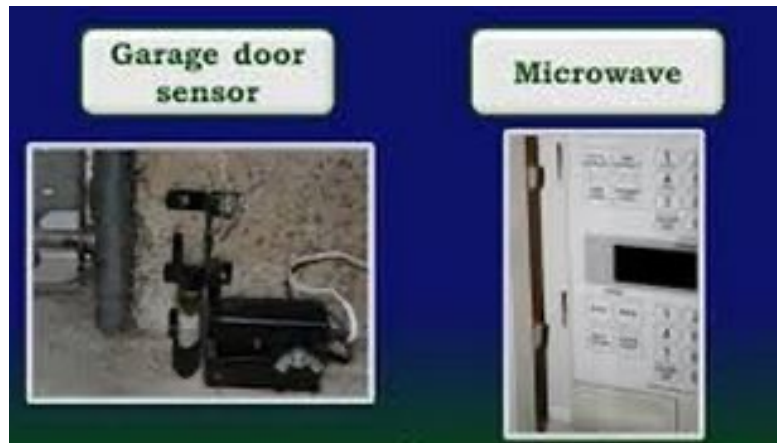
Drill Poka Yoke



POKA YOKE EXAMPLES



Andon Boards (Screens)



POKA YOKE OFFICE EXAMPLES

Your Google Account is more than just Gmail.

Talk, chat, share, schedule, store, organize, collaborate, discover, and create. Use Google products from Gmail to Google+ to YouTube, view your search history, all with one username and password, all backed up all the time and easy to find at (you guess

Password strength: Too short

Use at least 8 characters. Don't use a password from another site, or something too obvious like your pet's name. [Why?](#)

Take it all with you.

Name

First Last

Choose your username

firstlastst100@gmail.com

Create a password

.....

Short passwords are easy to guess. Try one with at least 8 characters.

Confirm your password

SoftwareTestingHelp.com

Google

softwar testing

software testing

software testing certification

software testing life cycle

software testing jobs

Showing results for [software testing](#)

Search instead for [softwar testing](#)

The page at https://mail.google.com says:

It seems like you forgot to attach a file.

You wrote "see attached" in your message, but there are no files attached. Send anyway?

OK Cancel

QUALITY AT SOURCE

(UPSTREAM QUALITY)

- Quality means meeting requirements of the customer (or next step in the process) and not creating defects.
- We can use tools such as poka yoke (mistake-proofing) and visual control to prevent errors

POKA YOKE

EXAMPLES IN THE OFFICE

What are some of the common mistake proofing devices on automobiles?

What are the current mistake proofing devices at your company?

Where might you be able to implement mistake proofing at your company?

QUIZ 4 :



1. What Tool is used to understand what is Critical to Quality (CTQ) by Forming 3 categories: *threshold*, *performance*, and *excitement*?
 - **KANO ANALYSIS**
2. Splitting Customers into groups according to different needs or behaviours is called _____.
 - **SEGMENTING**
3. CTQs are also sometimes called CTCs or CTSs. What does CTS stand for?
 - **CRITICAL TO SATISFACTION**
4. Give one example of a method used to understand the **Voice of the Customer**?
 - **SURVEYS**
 - **FEEDBACK**
 - **FOCUS GROUPS**
 - **REPEAT SALE METRICS, etc**



HOMEWORK REVIEW

(Open Computers and Log into your Portal)





End of Day 1

