

LEAN PRINCIPLES IN FACILITIES MANAGEMENT

MAXIMIZING PRODUCTIVITY AND EFFICIENCY

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Lean Six Sigma

Lean Six Sigma is a methodology that relies on a collaborative team effort to improve performance by systematically removing waste ^[1] and reducing variation. It combines [lean manufacturing/lean enterprise](#) and [Six Sigma](#) to eliminate the eight kinds of waste (Muda)

[Lean](#) is popular for its methodical approach to streamlining both manufacturing and service **processes by eliminating waste while continuing to deliver value to customers (Toyota)**

[Six Sigma](#) **is simply a method of efficiently solving a problem. (Bill Smith- Motorola)** Using Six Sigma reduces the amount of defective products manufactured or services provided, resulting in increased revenue and greater customer satisfaction.



Lean Principles

Kaizen, also known as ***continuous improvement***, is a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality.

Lean is a systematic approach of eliminating waste so every step adds value for the customer.

What are the benefits of using Lean Six Sigma?

- Increases Profit
- Decreases Costs
- Improves Efficiency & Effectiveness
- Helps Develop People/Employees



What Is Lean?

- ▶ A philosophy of minimizing waste to maximize customer value
- ▶ A business system for organizing and managing product development, operations, suppliers, and customer relations.
- ▶ **A methodology that emphasizes respect for people.**
- ▶ A system to identify problems and resolve through root cause analysis.
- ▶ **“Going to the place” to see waste and understand the workplace.(Genba)**
- ▶ **A fundamental change in the way people in the organization think and value, thus transforming how they behave.**
- ▶ A journey.



What Is Lean Thinking?

- ▶ A systematic approach to identifying and eliminating wasteful activity (**non value added activities**) in the pursuit of perfection through continuous improvement; **providing increased value to our customers.**
- ▶ Giving customers more of what they want and less of what they don't want.
- ▶ **A fundamental change how people within an organization think and what they value.**
- ▶ **Positive results are achieved from the supporting practices that follow once a common set of beliefs and principles are understood and adopted.**
- ▶ Poka-Yoke-Japanese for mistake or error prevention



Lean Philosophy

- ▶ Customers first
- ▶ People are the most valuable resource
- ▶ Continuous improvement
- ▶ Focus on where the work is done (*Genba*)
- ▶ Adding value is everyone's job
- ▶ Everyone is focused on doing better



Waste

- **Overproduction**–producing more than the customer orders or producing early. Inventory of any kind is usually waste. Overstocking shelves.
- **Waiting**–Waiting for parts, information, instructions or equipment must be avoided.
- **Transportation**–moving **material** between work sites, and handling more than once is waste
- **Inventory**–unnecessary equipment, work-in-process (WIP), finished goods, and excess operating supplies
- **Motion**–movement of equipment or **people**
- **Defective product**– Scrap-junk in the shop.
- **Skills**–One of the biggest wastes in facilities is under utilizing the capabilities of workers or providing inadequate training, especially with new technical hires.



Identifying and Eliminating Waste

Waste

- ▶ **D**efects
- ▶ **O**verproduction
- ▶ **W**aiting
- ▶ **N**on Value Added Processing
- ▶ **T**ransportation
- ▶ **I**nventory
- ▶ **M**otion
- ▶ **E**mployee (Underutilized)

Definition

- ▶ Work not done right the first time
- ▶ Doing more than needed sooner than needed
- ▶ Waiting for the next assignment
- ▶ Workarounds
- ▶ Unnecessary movement of products,, paperwork, etc.
- ▶ Excessive inventory cost through financial cost, spoilage
- ▶ Unnecessary movement
- ▶ Not fully engaging staff in improvement

Constraints on Performance Improvement

- ▶ Fear of the unknown
- ▶ Limited Resources
- ▶ Lack of Time
- ▶ Lack of Qualified Personnel
- ▶ Disgruntled Staff

The Supervisor is the bridge between higher levels of administration and the worker.

Leaders think and talk about the solutions. Followers think and talk about the problems-Brian Tracy

FOCUS ON THE SUPERVISORS



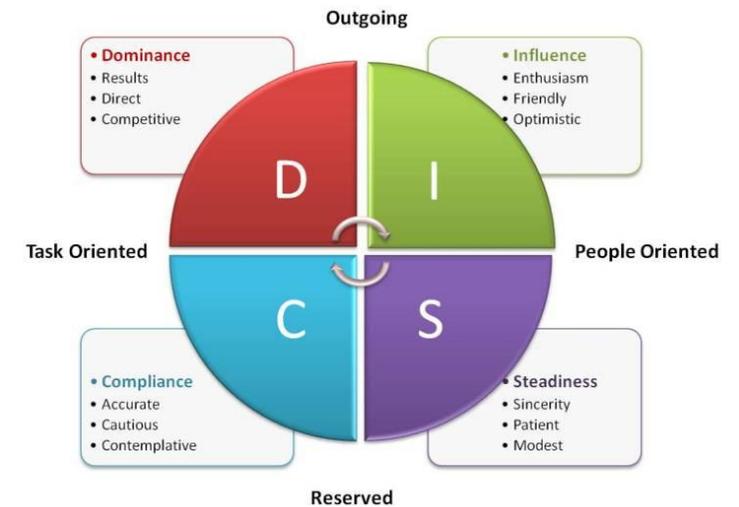
Generational Gaps We Face In The Workplace

- ▶ Poor Communication
- ▶ Decreased productivity, quality, & Innovation
- ▶ Misunderstood attitudes, relationships, & working environments
- ▶ Lack of Qualified Personnel
- ▶ Less engaged volunteers and co-workers
- ▶ Lack of motivation, initiative, and teamwork



Disc Communication Styles

DOMINANCE	INFLUENCE	STEADINESS	COMPLIANCE
<p>Control Specialist Shapes the environment by overcoming opposition to accomplish results.</p>	<p>Communication Specialist Shapes the environment by influencing or persuading others</p>	<p>Harmonizing Specialist Cooperates with others within existing circumstances to carry out the task.</p>	<p>Information Specialist "Works conscientiously within existing circumstances to ensure quality and accuracy.</p>
<p>Prioritizes: Task and Results Motivated by: Challenges Appears To Be: Direct & Self Assured Fears: Being taken advantage of"</p>	<p>Prioritizes: People and Communication Motivated by: Social Recognition Appears to be: Persuasive & enthusiastic Fears: Social Rejection</p>	<p>Prioritizes: People and Collaboration Motivated by: Stability and Status Quo Appears to be: A Loyal Team Person Fears: Unplanned Change</p>	<p>Prioritizes: Task and Accuracy Motivated by: Order & Proper Ways Appears to be: Detail Oriented Fears: Criticism of work</p>
<p>The "D" Style wants you to be Efficient</p>	<p>The "I" Style wants you to be Enthusiastic</p>	<p>The "S" Style wants you to be Sincere</p>	<p>The "C" Style wants you to be Correct</p>



Supervisor Focus

Accountability-The fact or condition of being accountable;responsibility. Blameworthiness, liability and the expectation of account-giving.

Accountability in the workplace:
Gallup Study of 47,000 employees

62% Not Engaged (*emotionally detached and likely to be doing little more than is necessary to keep their jobs*)

27% are actively disengaged (*they view their place of work negatively and are liable to spread that negativity to others*)

11% of workers worldwide are engaged (*emotionally connected to their workplace and feel they have the resources and support they need to succeed*)



Accountability



Accountability

In all workplaces there are creative excuses.

- *I don't have enough time.*
- *If only we had adequate staff (resources, etc.).*
- *That's not my job.*
- *The employees can't be trusted / are incompetent.*
- *I don't know how, anyway the boss didn't say that.*

Focus on what **WE** can do



Root Cause Analysis-5 Whys ???

Jefferson Monument is Deteriorating

Why #1 – Why is the monument deteriorating?

Because harsh chemicals are frequently used to clean the monument.

Why #2 – Why are harsh chemicals needed?

To clean off the large number of bird droppings on the monument

Why #3 – Why are there a large number of bird droppings on the monument?

Because the large population of spiders in and around the monument are a food source to the local birds

Why #4 – Why is there a large population of spiders in and around the monument?

Because vast swarms of insects, on which the spiders feed, are drawn to the monument at dusk.

Why #5 – Why are swarms of insects drawn to the monument at dusk?

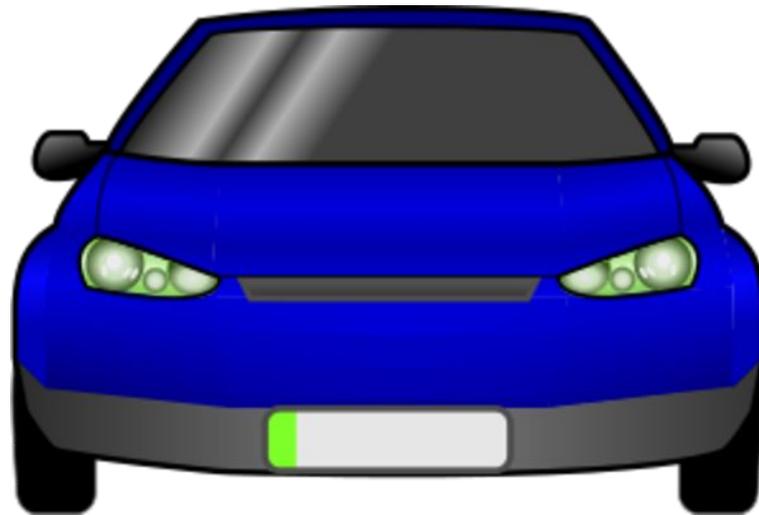
Because the lighting of the monument in the evening attracts the local insects.

Solution: Change how the monument is illuminated in the evening to prevent attraction of swarming insects.



5 Whys ???

Your car won't start on your way to work



5 Whys ???

- ▶ **Problem: You were on your way to work and your car won't start**
- ▶ 1st Why: The battery died
- ▶ 2nd Why: The alternator stopped functioning
- ▶ 3rd Why: The alternator belt broke
- ▶ 4th Why: The alternator belt was well beyond its useful service life and had not been replaced..
- ▶ 5th Why: The vehicle was not maintained according to recommended service schedule (Root cause)
- ▶ Solution: **Fix the root cause of the problem by implementing a maintenance schedule for the vehicle.**

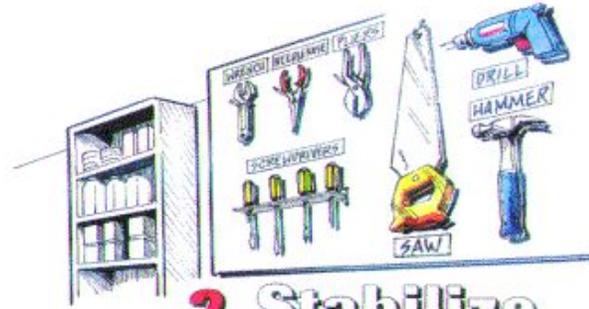
5 Whys ???

- ▶ **Problem: I did not get the promotion I wanted**
- ▶ 1st Why: They were unfair and biased against **me**
- ▶ 2nd Why: They don't like **me**
- ▶ 3rd Why: They say **I** talk too much and don't follow instructions
- ▶ 4th Why: They say **I** express myself in an unprofessional manner
- ▶ 5th Why: **I** constantly have a negative reaction to everything **I** am asked to do
- ▶ **Solution: ???**

5 S's



1. Sort



2. Stabilize



5. Sustain

5 S's



3. Shine

TIMES	DELIVERY SCHEDULE	DESTINATIONS
.....
.....
.....
.....
.....
.....
.....
.....
.....

4. Standardize

5S Process

- ▶ **Sort-** Remove any unwanted or unnecessary items from area.
- ▶ **Stabilize**(set in order)-Place the needed items back into the work area in an organized and efficient manner.
- ▶ **Shine**-Clean! Inspect while cleaning. Make cleaning easier by creating “home” locations for cleaning/maintenance/supplies
- ▶ **Standardize**- Utilize visual controls and establish rules to control the first 3 S's
- ▶ **Sustain**- Train and communicate the success of the project so all potential users of the area understand. Use a scoring system as a visual control to protect from backsliding.



Sort

- ▶ Determine what is needed in the area
- ▶ Go through the items in the area
- ▶ Identify what is needed in the work area
- ▶ Remove what is not needed
- ▶ Keep only the quantities that are needed for a given amount of time

Stabilize and set in order

- ▶ A place for everything and everything in its place
- ▶ Find the best location (look for ways to minimize motion, transportation, & inventory)
- ▶ Set size limits on what will be kept in the area
- ▶ Safety first
- ▶ Initially work with temporary materials (e.g., sticky notes, tape, cardboard templates) until concept and/or location is validated



Shine

- ▶ Inspection through cleaning
- ▶ Clean up the area
- ▶ Clean both the inside and outside
- ▶ Look at ways to prevent dirt, dust, and contamination from occurring
- ▶ Use as an opportunity to inspect and perform necessary maintenance
- ▶ Make shine a daily part of the operation

Standardize

- ▶ Establish clear guidelines & standards of accountability
- ▶ Create procedures and rules to maintain the first 3S (Sort/Set/Shine)
- ▶ Create standards with agreement
- ▶ Set standards where they are understood by anyone
- ▶ Make standards visible

Sustain

- ▶ Make sure the first 4S's are maintained
- ▶ Get employees involved
- ▶ Set up audit program at all levels
- ▶ Daily 5S checklist for front line employees
- ▶ Weekly 5S audit sheet for supervisors
- ▶ Monthly audits by management
- ▶ Create incentives-Recognition boards, awards, competitions

5S Visual Controls



Visual Controls



Same Shop – Pre/Post 5S



Visual Controls



Importance of Standardization

- ▶ Standardization is important in order to maintain a consistent ordered process to enable a repeatable process time after time
- ▶ Comprised of compliance to standards and the presence of standardized work
- ▶ Safest, easiest, and most effective way of performing the job
- ▶ Designed by the people doing the job
- ▶ Provides the basis for continuous improvement

Think of an organization that excels at standardization????



Making A Difference Through Standardization and Great Customer Service



- ▶ Pleasant demeanor-Most likely to say please and thank you 95.2%
- ▶ Insist on speed and accuracy
- ▶ Employees required to make eye contact and smile
- ▶ Introduced tablet ordering in drive thru
- ▶ Invests more in employee training than any other company
- ▶ Hands on supervision
- ▶ Ability to close Sundays and pay employees higher wages



Bridging the Gap

Creating an effective cross generational team



Mobile Working



Example of Work Instructions



Example: Visual Work Instructions

VOLVO Task Code: 6417 Task: WATER SE Version: 1 5.410
Task Name: Water Separator - Assembly

People Required: 1 Start: 10/1/2004 Start Serial: 0
Task Time: 6:00 End Date: 01/12/04 End Serial: 0

Options

OrderCode	PartCode	PartDesc	Qty	InstCd	Spec/Prs	Stat/Iss
31712	11141132	PLATE	1	547	AM0009	
31712	944612	FLANGE SCREW M10X30	2	582	AM0009	
31712	944663	PLANE GASKET, 16.7	2	540	AM0009	
31712	960831	PLUG, M16X1.5-12	2	339	AM0009	
31712	960848	NIPLLE, 12 M16X1.5 L	2	320	AM0009	
31712	947922	GASKET, 16 X 20	2	315	AM0010	
31712	11110090	WATER SEPARATOR	1	587	AM0008	
31712	946908	NOSE, 1/2"	0	580	AM0005	

1 **94472 FLANGE SCREW M10X30**
Remove all red blanking plugs from water separator (4)
Operation: Attach water separator to plate using screws.

2 **944663 PLANE GASKET, 16.7** Flat
960831 PLUG, M16X1.5-12
Operation: INSTALL PLUGS (POS. 46) WITH PLANE GASKETS (POS. 90) IN THE FUEL OUTLET PORT NEAREST THE VENT AND IN THE INLET PORT ON THE OPPOSITE SIDE.

3 **947922 GASKET, 16 X 20**
960848 NIPLLE, 12 M16X1.5 L
Operation: INSTALL NIPLLES (POS. 45) WITH GASKETS (POS. 44) IN THE REMAINING INLET AND OUTLET PORTS.

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Key components: Overviews, photos, diagrams, plain text, and samples.

3 **Parts: 1139898 FRONT FRAME**
Tools: Hammer
Operation: Install seal on bearing to facing downwards before installation, install bearing into Front Frame Top Bore using bearing driver. Use bearing press if necessary.
Warning: Bearing installation tool (Lubricator/Sealoff/Insulator) ENERGY HYDRAULIC PRESS MODEL P101008 BEARING INSTALLATION PLATE - V1719 V1724

4 **Operation:** Install seal on top of bearing in the same manner you did in step 2.

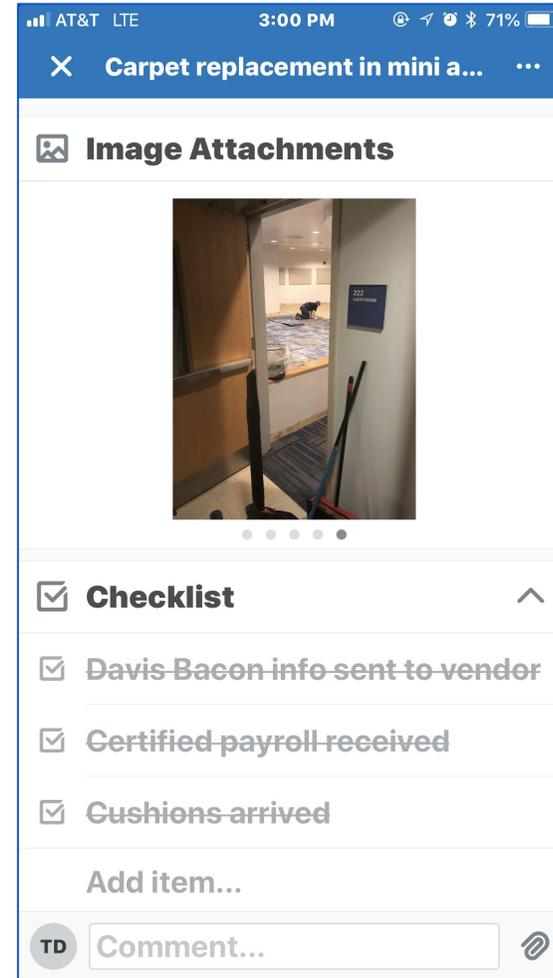
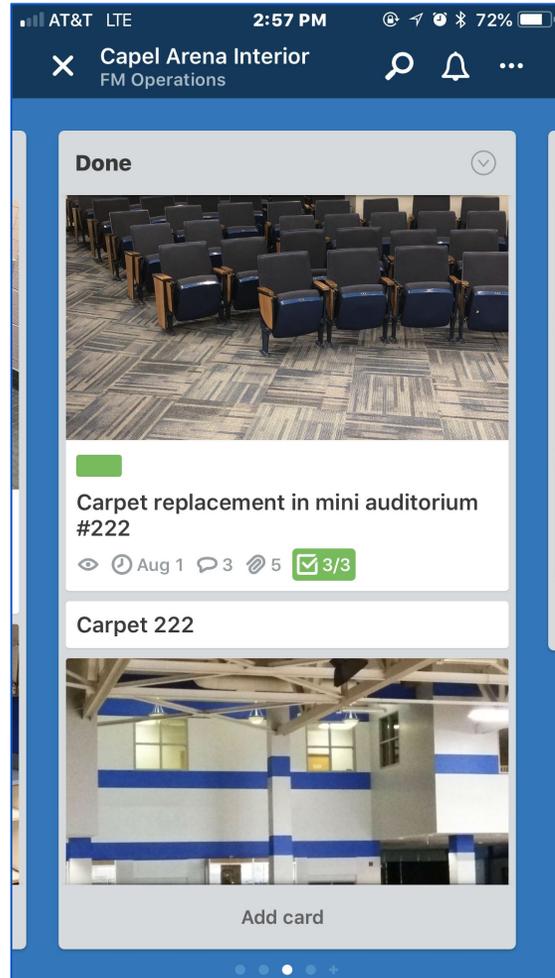
5 **Parts: 11141261 PLATE, RETAINER 960247 FLANGE SCREW, 5/16X1/2**
Tools: 3/8" Drive Sockets (12 point) 5/8" Socket Air Gun Torque Wrenches 3/8" Drive
Operation: INSTALL RETAINER PLATE WITH ITS GREASE FITTING HOLE LOCKED OPPOSITE THE HOLE IN THE WELD-IN HUB. SECURE USING SCREWS.
Range: 25Nm ~ 26-28

6 **Parts: 2209808 SEAL**
Operation: INSTALL SEAL INSIDE GROOVE ON BOTTOM BORE. REPEAT PROCESS FOR TOP RETAINER PLATE.
Warning: Insure that seals are not twisted after installation.

Onboarding Process Template

PRIOR TO START	FIRST DAY	FIRST WEEK	FIRST MONTH
<ul style="list-style-type: none"> Call to confirm start date and time Discuss relocation Discuss dress code Provide link to company / department onboarding webpage Build Welcome Packet Confirm receipt of all recruitment paperwork and background check completion Confirm Offer Letter receipt / acceptance Prepare work station / area Order passkey and ID Order email and phone setup Order any hardware, software, peripherals, etc. Enroll new hire in HR briefing, orientation, etc. Schedule any pertinent training sessions 	<ul style="list-style-type: none"> Welcome upon arrival and guide to workstation Deliver and review Welcome Packet Discuss break / meal policies Introduce designated coworker resource Confirm receipt and functionality of passkeys Connect with HR to complete any further paperwork Review Portal Sign Offer Letter Review software, hardware, technology, printers, etc. Confirm email and phone setup Review Technology Acceptable Use policies Assist with online directory setup Make further introductions Conduct or schedule tours 	<ul style="list-style-type: none"> Ask how first week went Assist with questions Review training schedule Review technology functionality Discuss company culture and work style Discuss current projects and cyclical processes Review company mission statement, vision, and policies 	<ul style="list-style-type: none"> Assess need for weekly or bi-weekly meetings Answer any questions Set short and long-term goals Answer any questions
			FIRST THREE MONTHS
			<ul style="list-style-type: none"> Performance review Review short and long-term goals Answer any questions

Project Updates



Importance of Standardization

Define Why	Define What	Define How
Lead Change	Support Change	Implement Change
Empower	Respond/Trust	Accept/Trust
Share/Trust	Coach/Teach	Accept Responsibility

Successful transformations require involvement and commitment at **all levels**



Things We Hide Behind

- ▶ Past Practice
- ▶ Tradition
- ▶ Procedures
- ▶ Politics
- ▶ Standards
- ▶ Contracts
- ▶ **Excuses**



**If it's important to you, you will find a way if not
you will find an excuse**

Questions

