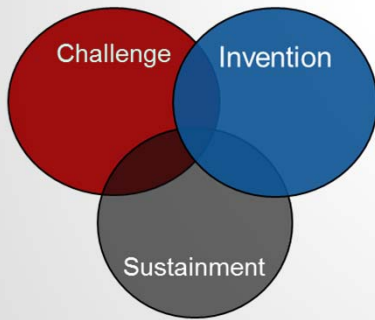


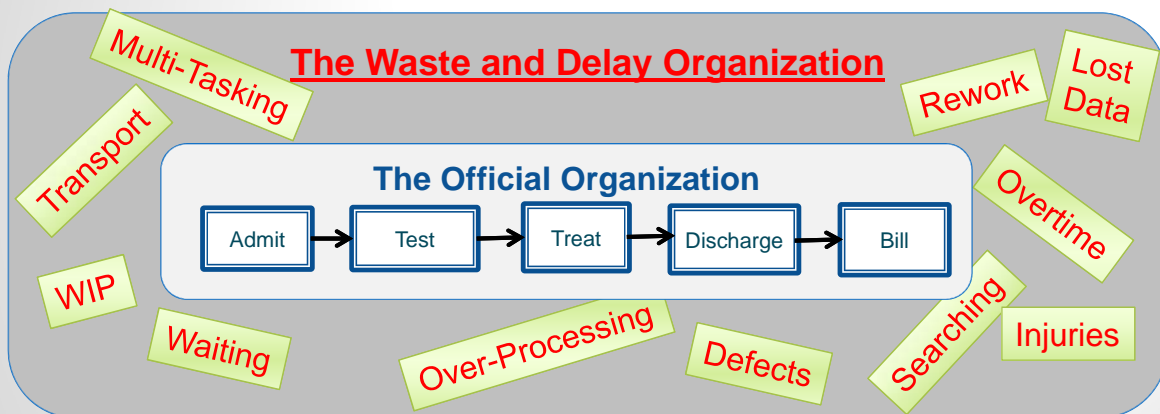
Adaptive Lean Six Sigma: Minimally Invasive Concepts



John Muka, Ph.D
September 19, 2012

“Advantage that Succeeds”®

Everyone has two Organizations:



Introducing: Lean + Six Sigma

▶ Lean:

- Developed at Toyota over the past 60 Years
- Focus: Make Waste and Delay Visible and then Eliminate

▶ Six Sigma:

- American Engineering
- Focus: Data Driven Decision making;
- Process Capability
 - “3.4 defects per Million opportunities”

99.9997%

Womack and Jones

▶ Value: to the Customer (Next Operation as Customer)

▶ Value Stream:

- Steps used to create the Value

▶ Flow

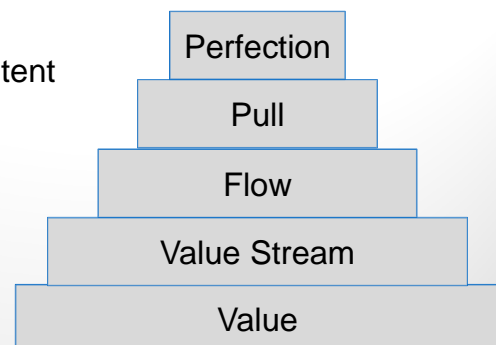
- Flow Units always increasing in Value Content
- Staff always adding Value

▶ Pull: --not Build ahead

▶ Perfection:

- Prevent defects
- Never allow defects to move to next step

Your Manager is a Customer



Basic Problems:

Flow/Delays

When/Where does the "Flow Unit" Stop?

What obstacles stop the "Flow Unit"?

What stops value added work?

Waste

When/Where are we wasting:

- ___ Materials?
- ___ Equipment?
- ___ Time/Labor?
- ___ Other?

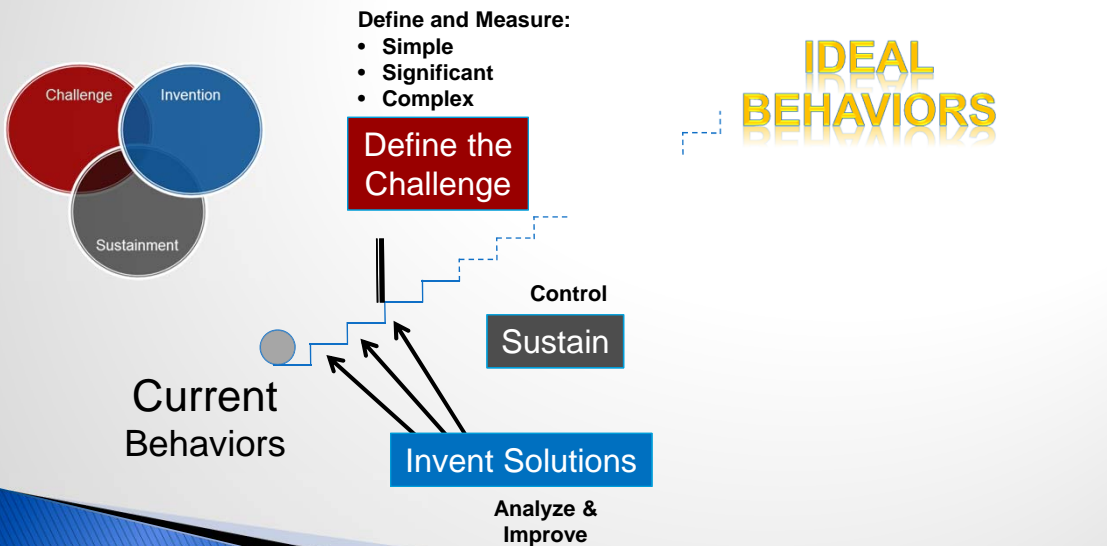
Paying too much?

Defects

What things are often not done right the first time?

What excessive Process variation causes us to miss customer specification or requirements?

Process Improvement System



Lean vs. Six Sigma

Lean: “Go and See”

- ▶ Eliminate Waste and Delay
- ▶ Minimal Investment
- ▶ Quick ROI
- ▶ Solve many small problems
- ▶ Simple Tools
- ▶ Listen to the people
- ▶ Direct Observation
- ▶ “Tribal” Level

Six Sigma: “Data Driven”

- ▶ Reduce Variation and Defects
- ▶ Planned Investment
- ▶ Predictable ROI
- ▶ Solve a few complex problems
- ▶ Rigorous Tools
- ▶ Listen to the numbers
- ▶ Expert Analysis
- ▶ Command/Control

Apply to Work and Flow

Types of Work

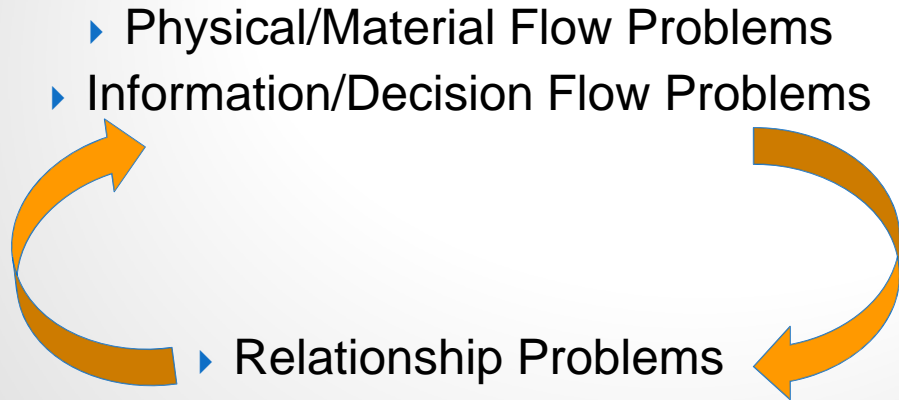
- ▶ Manufacturing:
 - Visible/ “Bolted Down”
 - Apply the laws of Physics
- ▶ Creative/Knowledge Work
 - Invisible/non-Material
 - Some Laws of Physics apply
- ▶ Service:

“A Moment in Time”

Types of Flow

- ▶ Physical/Material
- ▶ Information/Decisions
 - Theory
 - Heuristics
- ▶ Relationships:
 - Expectations/Fairness
 - Debts and Favors

Improve Flow → Improve Relationships



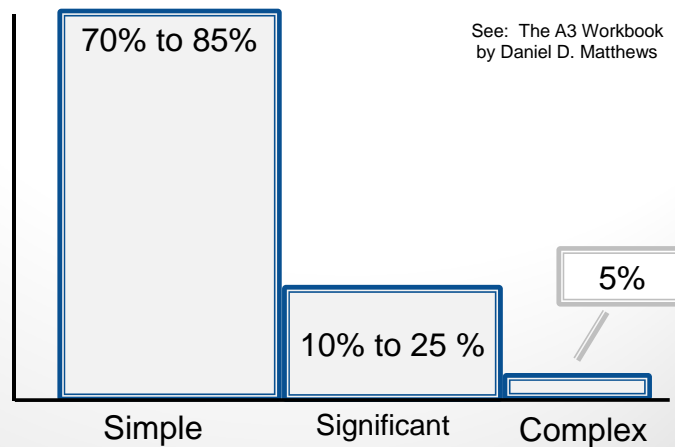
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Problem Complexity: Lean vs. Six Sigma

- Simple: Everyday Problems that can be addressed with Existing resources
- Significant: need Management Buy-in and approval plus significant resources
- Complex: need extensive data Analysis from Six Sigma

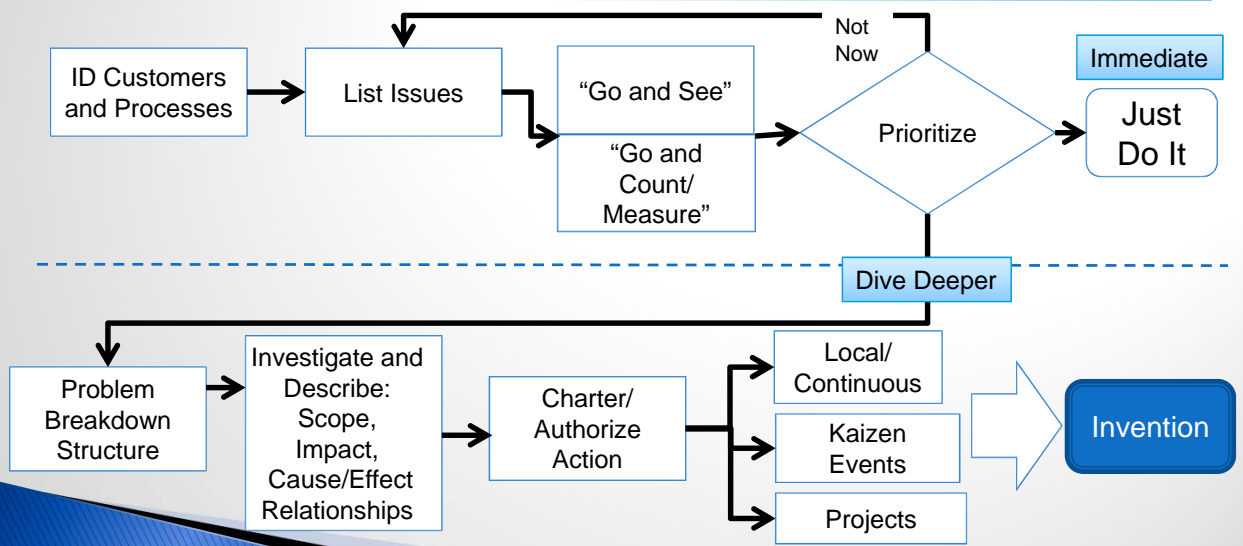
Most problems can be resolved with basic tools applied close to the Working Staff Level



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Challenge Phase



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What is the Value...?

IDEAL BEHAVIORS




- What Actions?
- When?
- Where?

- To the Client?
- To the Organization?
- To the Individual?

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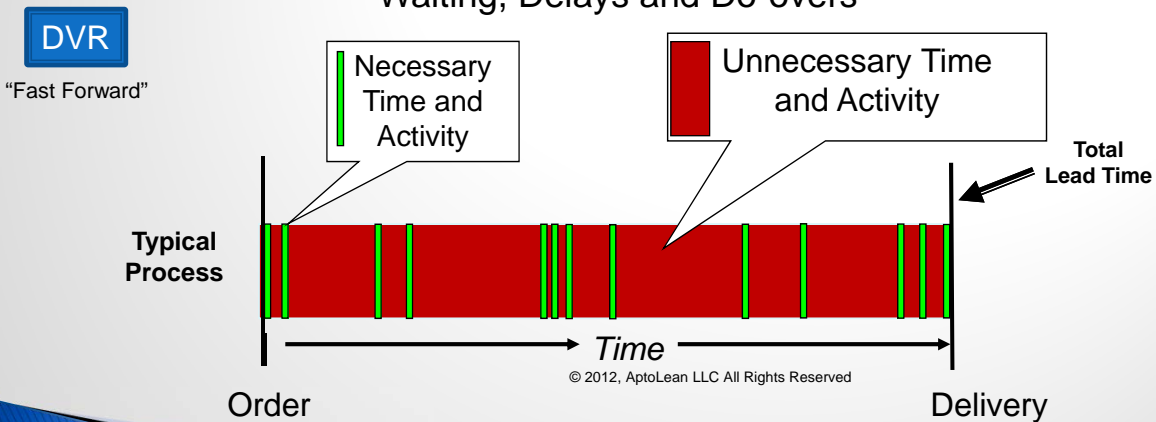
Value: Red – Yellow - Green

	Value Added	Produces or Changes the material, information or service flow in some way that the customer values and is done correctly the first time	Example: "Painting the car hood"
	Required non-Value added	Produces or Changes the material, information or service flow in some way that the customer does <u>not</u> value but is currently required for some other reason.	
	Non-Value Added	Does not produce or change anything. Or produces/changes things that are not valued by the customer or necessary for any other reason. Anything not done right the first time.	

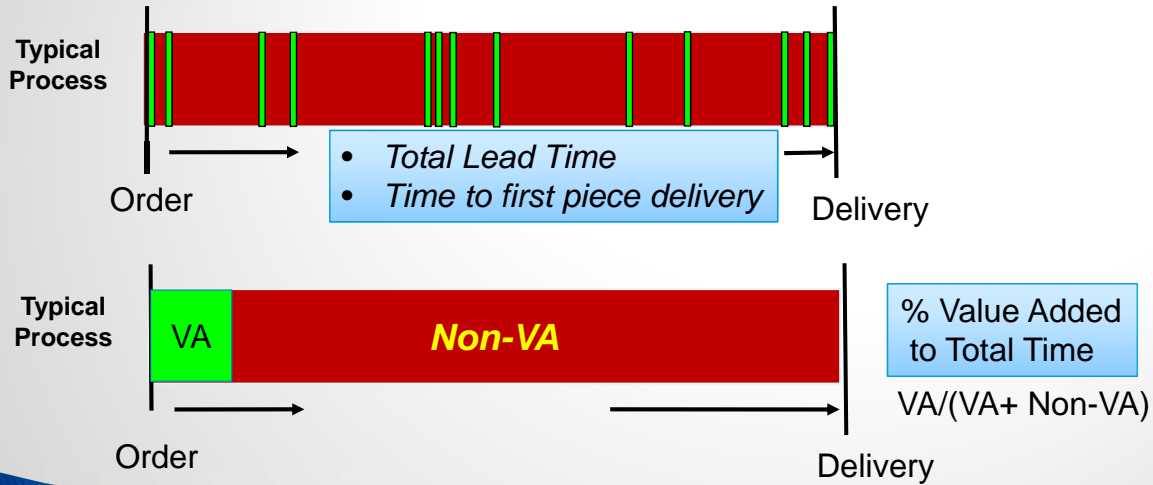
What if your customer sat in your cubicle with you...?

Value Added vs. Non-Value Added

Necessary activities are interrupted by Waiting, Delays and Do-overs



Flow Metrics: Delays



7 Forms of Waste: Flow, Waste, Defects

	7 Wastes	“As Is” Examples	Ideals
F	Waiting	Product Waiting or People Waiting	People always receiving Value Added – People always doing Value Added work
F	Inventory	Items that have been purchased or started but not yet completed	Once started, work continues until unit is completed and delivered to Customer
F	Over-Production	Producing more than the Customer needs at a point in time	Produce exactly the quantity needed at a point in time
W	Over-Processing	Using more to produce an output than is actually needed	Use the minimum of time and effort to produce value for the Customer
W	Motion	Movements that do not add value	All movements are value-added
W	Transportation	Moving Materials or information between points that does not add value	Material and information readily at hand when needed – minimum possible transport
D	Defects	Anything that does not meet Customer Requirements	Produce no defects – Never pass defective output onward

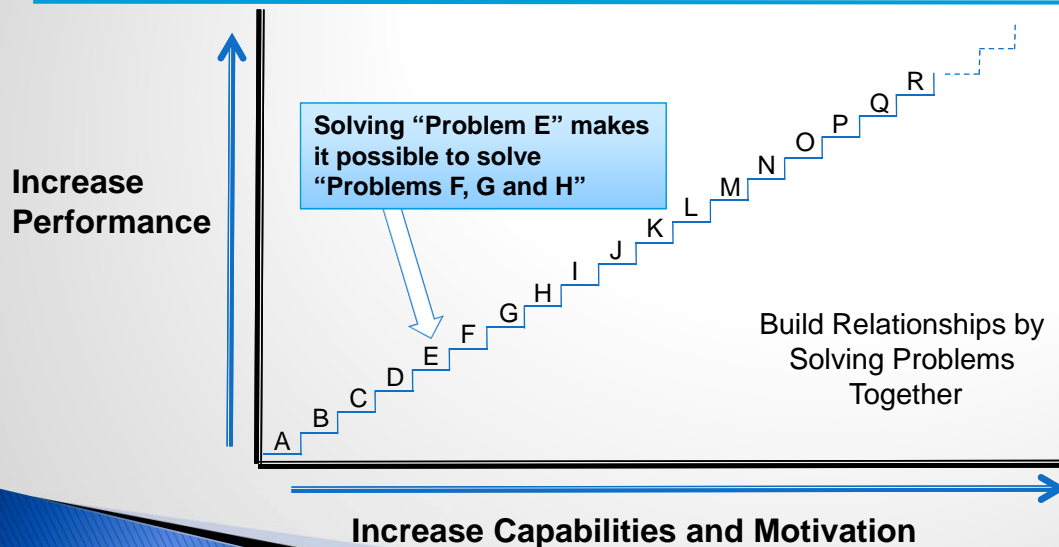
7 Forms of Waste: Flow, Waste, Defects

	7 Wastes	Tools/Metrics	Primary Impact/Results
F	Waiting	Total Lead Time; % VA to Total time;	Increased Effective Capacity (\$ of Margin)
F	Inventory	Work in Process (WIP); Square Footage;	
F	Over-Production	TAKT Time; Cycle Time; Work-Load Balance; Variability	
W	Over-Processing	# of Steps; # of Handoffs; # of Contacts; Inputs used vs. Inputs Planned	Reduced \$ Costs: <ul style="list-style-type: none"> • Material • Labor • Facilities/Equipment • Supplies • Facilities
W	Motion	Travel Distance; Time to retrieval; Square Footage needed;	
W	Transportation	Transport Costs; Travel Distance;	
D	Defects	Scrap and Rework Costs; Expedited Transportation;	Reduced \$ Costs: <ul style="list-style-type: none"> • Rework and Scrap

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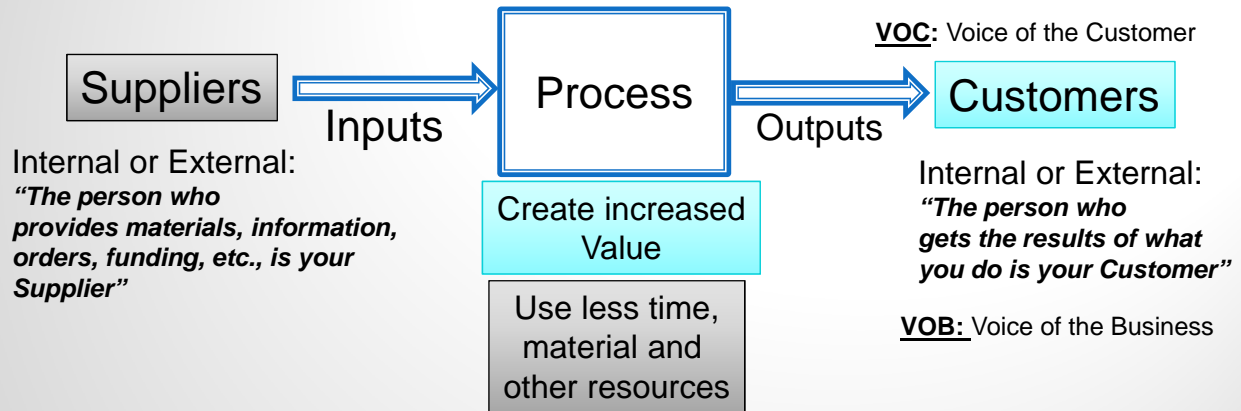
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S-I-P-O-C: “All Work is a Process”



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“Gemba” and “Genchi Genbutsu”

- ▶ **“Go to the Gemba”:**
 - “Go to the actual place”
 - “The actual place where the product is being produced”
 - “The actual place where the service is being provided”
 - “The actual place where the customer is using the product or service”
- ▶ **Genchi Genbutsu:** “Go and see and take action”

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Micromanagement: “Why are you watching me?”

- ▶ **Micromanagement:**
 - Let me tell you how to do the job (and I don’t even really know how your job works)
 - Remember: Your evaluation is coming up!
- ▶ **Coaching:**
 - Let me stand shoulder to shoulder with you and find a better way to get the work done

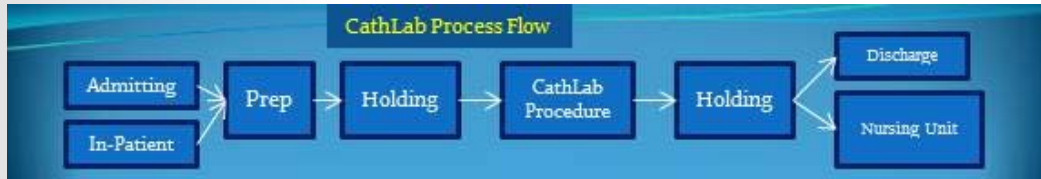
“Chalk Circle” Supportive Observation

1. Observe the actual work for at least 1 hour
 - Do not make any changes
 - Observe carefully
 2. Team with people who do the work
 3. Focus on small glitches, workarounds, do-overs
1. Apply the 4 Rules of Process Design
 2. Eliminate one or two issues
 3. Use Sustainment to make the changes permanent



Build toward Supportive Observation

Walk the Value Stream



Build
toward
Supportive
Observation

• Key Questions:

- What is important about what you do?
- How do you know what to do? When to start?
- How do you know you are finished?
- What problems do you have?
- What do you do when you have a problem?
- Where does your work (and information) come from?

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Four Rules of Process Design

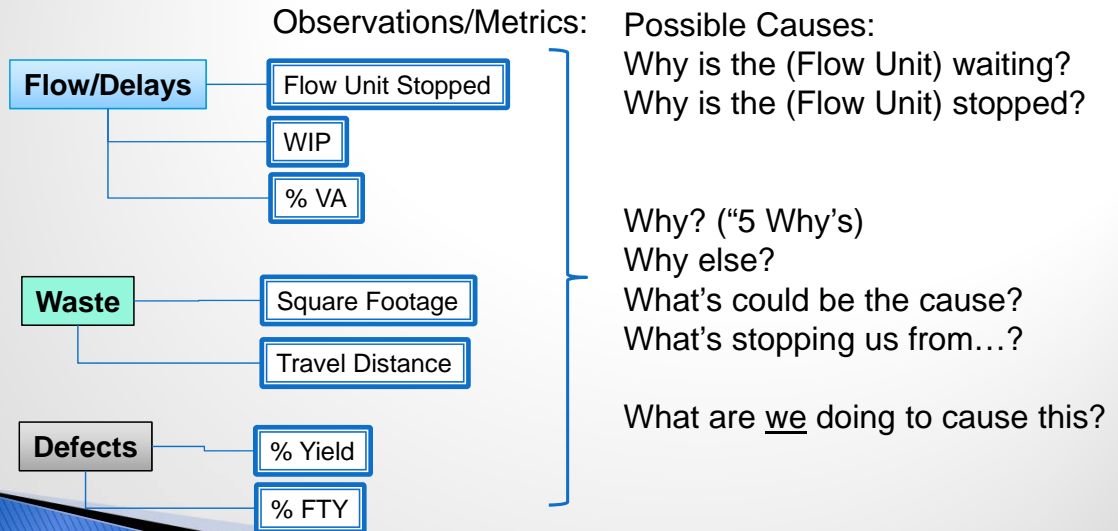
1. **Activities:** All work shall be highly specified as to content, sequence, timing and outcomes
2. **Connections:** All Supplier-Customer connections shall be direct, one-to-one, with unambiguous ways to send requests and receive responses
3. **Pathways:** Process flow will include all necessary steps and no un-necessary steps
4. **Improvement:** Any improvement will be done using the Scientific method, under the direction of a Teacher, as close in time and location to the problem as possible.

Spear and Bowen: Decoding the DNA of
the Toyota Production System
Kenagy: Designed to Adapt

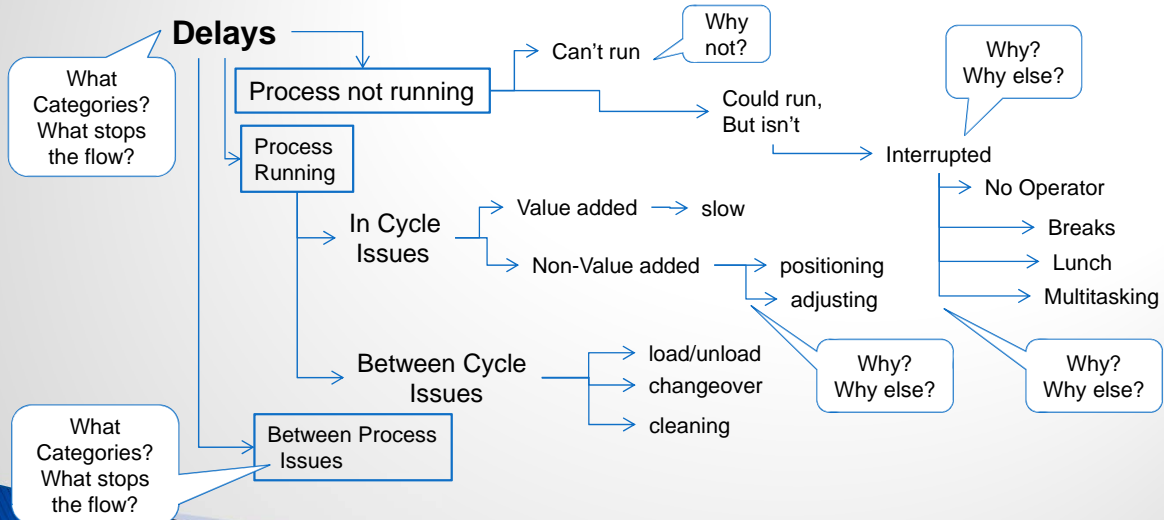
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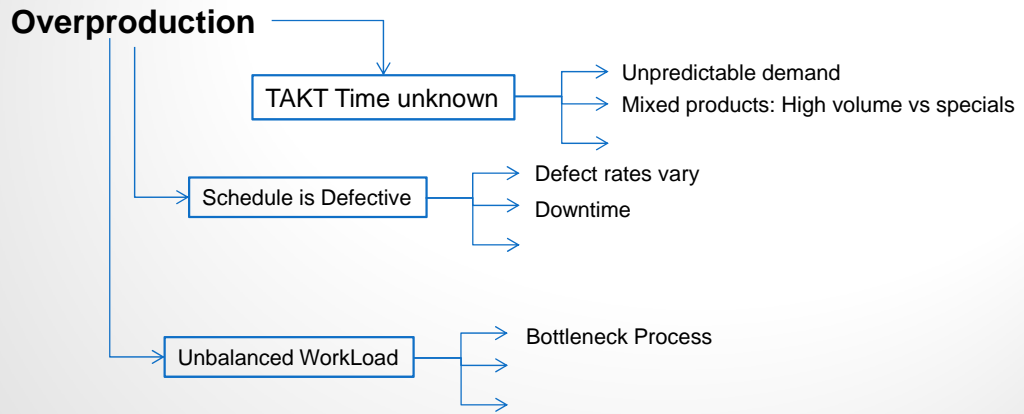
Problem Breakdown Structure



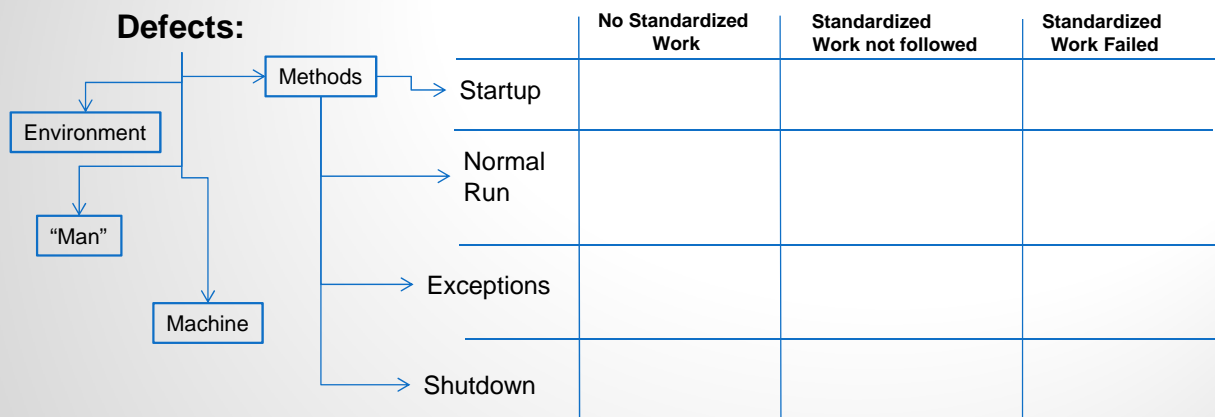
Flow/Delay: Flow Unit Stopped or Slowed



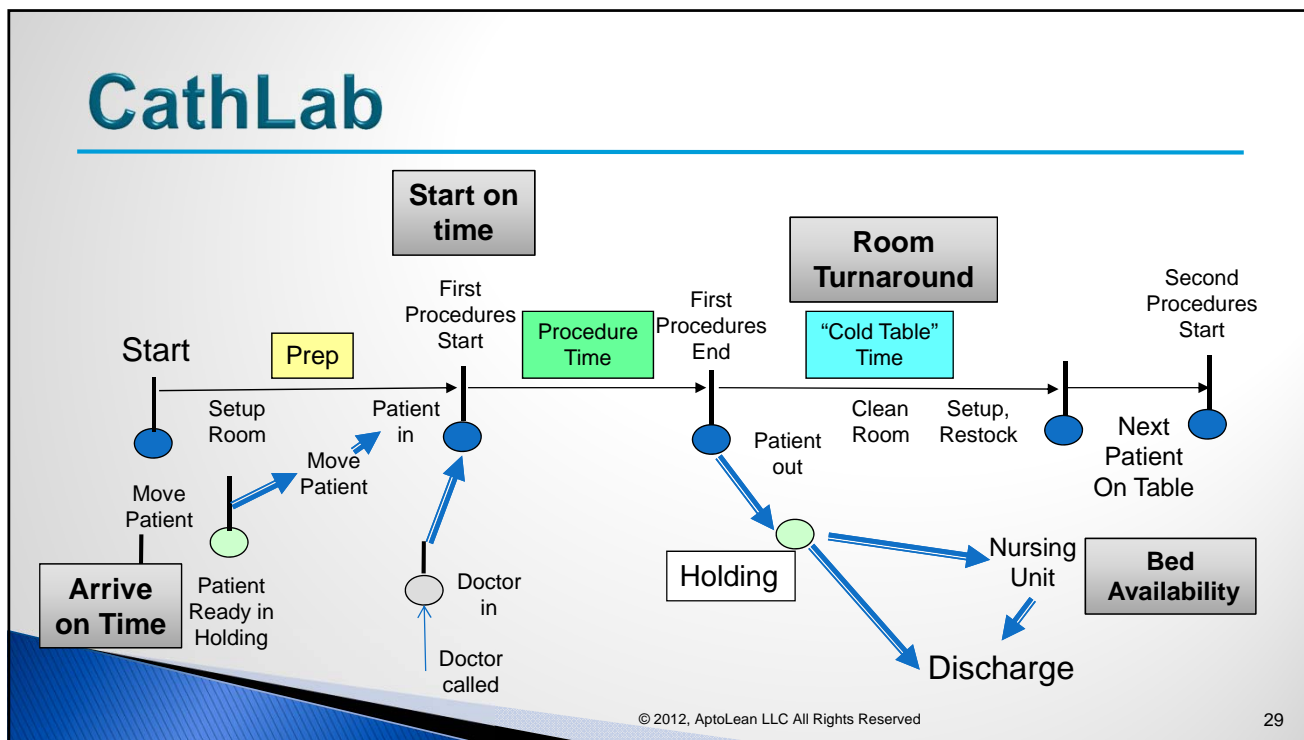
Flow/Delay Problems: Overproduction



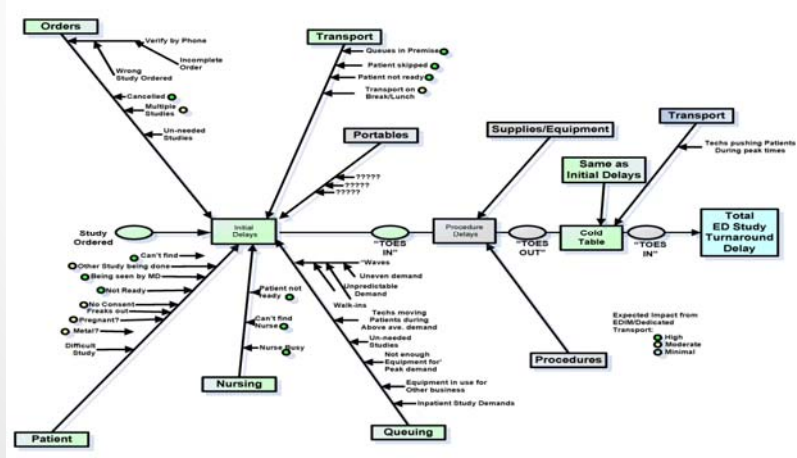
Waste and Defects Problem Structure



CathLab



Radiology Delays



Sustainment

- ▶ You can't do the work and improve doing the work at the exact same time
- ▶ Therefore:
 - Additional resources will be needed

Standardized Work

- ▶ Analyze the Work
 - Apply “Standards” and Requirements:
 - Safety, Quality, Cost, Regulatory, Policies, Professional, etc.
 - Simplify and Standardize – remove waste
 - Include Kaizen and Project inputs
- ▶ Create or update Standardized Work
- ▶ Conduct or update Job Instruction
- ▶ Supportive Observation and Coaching

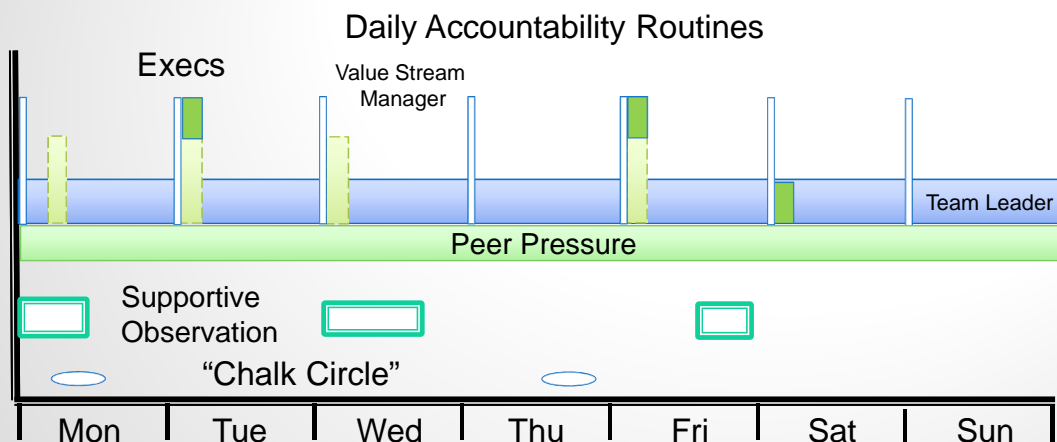
Monitor the Process: “Pull the Andon Cord”



- ▶ First line Staff signals a problem immediately
- ▶ Team Leader:
 - Go immediately to the Person who signaled
 - Assist
 - Assess
 - Implement Short term fix
 - Long term: find root cause and eliminate

“Jidoka”: Quality at the Source

Build a Sustainment System

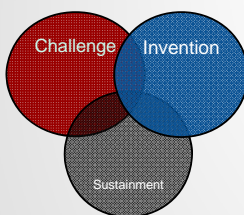


Implementation



- ▶ Select Model Line or Area
- ▶ Team Leader Role: select, train, coach
- ▶ Solve small glitches and problems permanently
- ▶ Increase scope and support with resources:
 - Move from activities, to connections, to pathways
- ▶ Implement Visual Controls
- ▶ Implement Daily Accountability routines
- ▶ Use Value Stream analysis to focus on key bottlenecks
- ▶ Bundle issues for Kaizen Events and Projects

AptoLean: Adaptive Lean Six Sigma



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