LEAN, SIX SIGMA, AND PROCESS IMPROVEMENT: FUNDAMENTALS, METHODS, AND APPLICATIONS FOR LAB PROFESSIONALS" WORKSHOP

Lab Quality Confab and Process Improvement Institute

New Orleans

October 2016

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Agenda

- Introductions – Introduce yourself to your table
- Short Lean Quiz –
- Brainstorm what is the meaning of Lean Thinking and World Class
- Make a list of Lean Tools – Exercise – BASICS Model
- What Results Should You Expect with Lean? - Brainstorm and show actuals?
- What results have you achieved?
- Lean and Growth
  - Linkage To Customer Value / Ellis Pyramid - brainstorm
  - How do You sell your new ideas? Paradigms – What new paradigms will exist in your business in the next 5 years?
  - How can you grow your business?
  - Change Equation – How do you SELL your ideas?
- How to create standard work
  - TWI Overview – How do you train your people? – Exercise and overview
  - How to conduct video analysis – the best way to find improvements
  - What is standard work? Why is it important? Linkage to TWI
  - Standard work audits – linkage to Leader Standard Work
- Capacity analysis - Analyze your current lab model using a PPCS (part production capacity sheet) Compare to your growth plans.
- Shop Floor Management / Quality – What is the Hidden Factory?
  - 4 Legged Stool – Visual Management
  - The problem with RCCA - 4 Typical Corrective Actions
  - Introducing the MSA Tool
- Lean Tool Application and exercises – Use class videos (Optional)
- What Is An Improvement You Can Make When You Return?

Lean Specialist I Test – 5 minutes

- **What are the four things a product can do? Yellow Belt**
- **What are the two things and operator can do? Yellow Belt**
- **What are the 5S's? Yellow Belt**
- **What are the eight wastes? Yellow Belt**
- **What are the 4 parts of SMED?**
- **What is internal time vs. external time?**
- **What is a part production capacity sheet?**
- **What is OEE?**
- **What is Poka Yoke?**
- **What are the two pillars of the Toyota House?**
- **What is Jidoka?**
- **What are the 3 components of visual management systems?**
- **What are the three components of standard work? Who is it written for?**
- **What is the definition of total labor time?**
- **What is the definition of thru put time?**
- **What is takt time?**
- **How do you calculate the number of operators needed?**
- **How do you calculate the amount of WIP which should be req'd in a stable system?**
- **Does Lean apply to the office environment? Sales?**
- **Does Lean apply to Labs?**

Flip Chart Your Answers

What Is The Meaning Of Lean Thinking?

What Results Should You Expect With Lean?

What Lean/Sigma Tools Have You Used?

What Results Have You Achieved?

Why Lean?

Lean Gets Results!

Lean Tools Application Process – The BASICS Model

1. ***Baseline The Process***
- Train Executive Leadership To Lead The Culture Change
- Train Company Personnel JIT And Never Stop
- Go See And Understand, Walk The Process (Gemba)
- Assessment / Baseline Metrics And Present Findings
- I.D. , Prioritize, Scope Projects, And Create Team Charters
- Approve Charter With Key Stakeholders (Update Key Stakeholders As Necessary) And Pick Team Members
- Create Stakeholders Analysis, Communication & Training Plan
- Select Team Members (Dedicated Teams Where Possible)
- Train the Team Members
- Value Stream Map The Process*

2. ***Assess The Process***
- Determine The Customer Demand And Tact Time
- Process Flow Analysis - Become The Patient Or Product (VA Vs NVA) – spaghetti diagrams, process mapping
- Group Tech Analysis (Define Families)*
- Full Work Analysis Of The Operator (VA Vs NVA)
- Turn Over Analysis (Minimize Internal Setup)*

3. ***Suggest Solutions***
- Create The Optimal Layout, Workstation Design And Point Of Use Materials For The Process
- Determine The Capacity And Labor Requirements
- **Create Standard Work**
- Make And Approve Recommendations For Implementation
- Create the Process Block Diagram
- Pilot The Process
- Cross Train The Staff In The New Process (TWI)
- Plan P.O.U. Replenishment Strategy
- Develop And Communicate Full Implementation Plan And Review And Approve With Key Stakeholders
- Create Sustain Plan & Lean Audit Strategy and review with major stakeholders

4. ***Implement The New Process***
- Implement Construction Where Necessary
- Implement Metrics That Lead
- Implement Kanbans And Replenishment Strategy
- Incorporate Five S* And Visual Controls
- Mistake Proof And TPM* The Process
- Document Results

5. ***Check and Sustain***
- Update and Embed The Standard Work
- Kaizen, Kaizen, Kaizen (Back To Step 1)
- Create a culture of continuous improvement
- Continually Audit the process with accountable metrics and develop recovery action plans as needed.
- Continue to train, educate and benchmark
- Build the standard work into your quality system
- Use TWI for training and employee development

Do Not Underestimate The Change Management Required To Be Successful

****Some steps can be implemented independently, in parallel, or different order***

In Lab Processing Time - 2004
Potential Savings for monitored tests 20% - 70%

Thru-put Time STAT TAT Receipt to Result (Minutes)	Baseline Data	Revised Lean Projections	Variance	Percentage Change Baseline to Projected
APTT (TECAN)	34.00	25.00	9.00	26%
BMETPN (TECAN)	41.00	32.48	8.52	21%
H&H (no TECAN)	19.00	6.10	12.90	68%
HEMGP (no TECAN)	23.00	6.10	16.90	73%

Why is Through Put Time Important?

Core Lab Labor Savings - 2004

FTE Impacted by Core-Lab Lean	Pre Lean FTE	Post-Lean Lab FTE	Lean Goal FTE Savings	Lean Goal % FTE Reduction	Lean Goal FTE Reduction	1- YR Lab Goals	Lab % FTE Reduction	Lab yr-1	Lab yr-3
Phlebotomy	28.7	22.2	6.5	23%	$ 199,149.60	3.2	11%	$ 98,042.88	$ 294,128.64
Processing	28.9	25.2	3.7	13%	$ 112,596.12	3	10%	$ 91,915.20	$ 275,745.60
Chemistry*	14.7	9.8	4.9	33%	$ 305,575.30	1.5	10%	$ 93,163.20	$ 279,489.60
Hematology*	19.1	14.0	5.1	27%	$ 315,202.16	2.5	13%	$ 155,272.00	$ 465,816.00
Totals	91.4	71.2	20.2	22%	$ 932,523.18	10.2	11%	$ 438,393.28	$ 1,315,179.84
Overtime					$ 71,762.80			$ 71,762.80	$ 215,288.40
Totals					$ 1,004,285.98			$ 510,156.08	$ 1,530,468.24

1 Year Total Labor Opportunity of $510,156
No FTE Layoffs

Lean Opportunity Estimate - Non Core Lab Labor Analysis

Labor Category - Assumes Current Mix and Demand	Baseline Data	Lean Projections	Variance	Percentage Change Baseline to Projected	Lab Signed Up For	Percentage Change Baseline to Projected	Stretch Targets	Percentage Change Baseline to Projected
Non Core Lab Labor								
Cyto	14.00	11.00	3.00	21.4%		100.0%	8.00	42.9%
Histo	19.00	15.00	4.00	21.1%		100.0%	9.00	52.6%
IHC	1.00	1.00	0.00	0.0%		100.0%	1.00	0.0%
Flow/Bone Marrow	2.00	1.50	0.50	25.0%		100.0%	0.50	75.0%
Micro	23.00	18.00	5.00	21.7%		100.0%	13.00	43.5%
Subtotal Non Core Areas	**59.00**	**46.50**	**12.50**	**21.2%**	**0.00**	**100.0%**	**31.50**	**46.6%**
Sub Total Salary All Areas	**6.00**	**5.00**	**1.00**	**16.7%**		**100.0%**	**3.00**	**50.0%**
Total # of FTEs (Less OT)	**65.00**	**51.50**	**13.50**	**20.8%**		**100.0%**	**34.50**	**46.9%**

Additional Lean Opportunities for areas not leaned out to date:

Histo, Cyto prep, IHC, Flow/ Bone Marrow, Micro, Admin, Outreach, Sendout, Tissue Typing, Blood Bank

Additional savings opportunities in:

Reducing administrative Space in Core and Non Core

Cycle time reductions

Lab SQ Footage Comparison: Options A , B, C

Current and New Building Karlsburger				
	Current Sq. Ft	**Future Ft**	**Variance**	**Variance %**
Net Available	**34,000**	**55,190**	**21,190**	**62%**
Non Core Laboratory	5,191	8,120	2,929	56%
Micro Laboratory	2,076	3,830	1,754	84%
Core Laboratory	7,929	10,520	2,591	33%
Total Laboratory	15,196	22,470	7,274	48%
Total Non Laboratory	18,804	32,720	13,916	74%

Comparison to New Building
Using Architect Analysis
74% Savings
Over Architect's 2 Floor Plan

Current and New Building Plan's B & C				
	Current Sq. Ft	**Future Sq. Ft**	**Variance**	**Variance %**
Net Available	**34,000**	**41,190**	**7,190**	**21%**
Non Core Laboratory	5,191	3,720	(1,471)	-28%
Micro Laboratory	2,076	2,076	0	0%
Core Laboratory	7,929	5,461	(2,468)	-31%
Total Laboratory	15,196	11,257	(3,939)	-26%
Total Non Laboratory	18,804	29,933	11,129	59%

Current Vs Revised New
Building Plans with Future
Lean SF Comparisons
59% Savings
But No Second Floor

Current Building Plan A				
	Current Sq. Ft	**Future Sq. Ft**	**Variance**	**Variance %**
Net Available	**34,000**	**34,000**	**0**	**0%**
Non Core Laboratory	5,191	3,720	(1,471)	-28%
Micro Laboratory	2,076	2,076	0	0%
Core Laboratory	7,929	5,461	(2,468)	-31%
Total Laboratory	15,196	11,257	(3,939)	-26%
Total Non Laboratory	18,804	22,743	3,939	21%

Utilizing Current State Layout
and Scrapping New Building
Plans 21% Savings
But No New Building

Hospital Patient Services Area 2005 Tray Line (Meal Assembly)

Before

After

Baseline Data

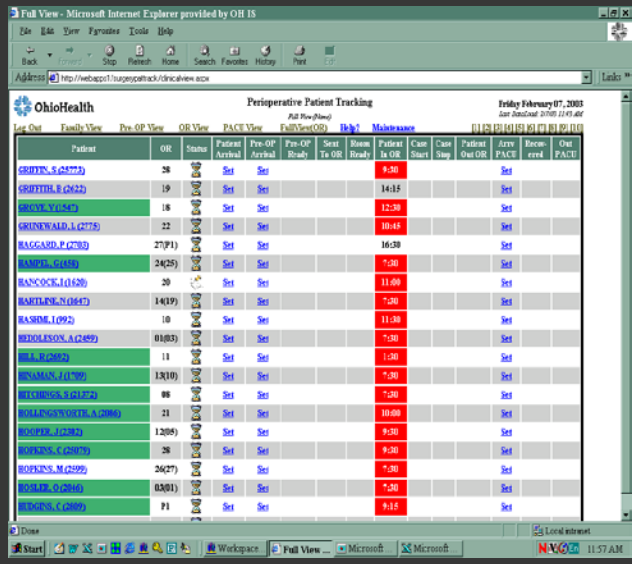
No# of Operators per Day	18
No# of Operators (7 Days)	24
Square Footage	2,500
Seconds to complete (1) Tray	**214**
Meals per Day	2,419
Total Labor Hours	144

Pilot #2 Data

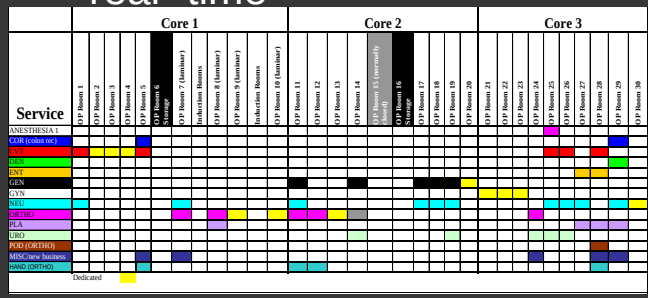
No# of Operators per Day	15	-38%
No# of Operators per Cell	3	
No# of Cells	2	
Square Footage (2 Lines)	552	-78%
Seconds to complete (1) Tray	**15.75**	**-93%**
Meals per Day	2,742	+13%
Total Labor Hours	72	-50%

Hospital Implementation – Ortho Surgery and SPD
Sept 02 – Jan 03

- $2 million in cost savings
- Identified $50 Million Opportunity Cost
- 7.8% decrease in labor expense per case
- Improved PAT first pass yield from 5% to 40%.
- Improved Pre-Admission Testing “System” resulting in improvement in first pass yield from 9% to 75% in PreOp.
- Sharpen/repair tags implemented for instrumentation from the OR’s
- Ortho Pilot: Patient out to patient in:
  - 48% reduction Patient in to cut
  - 2% reduction Patient out to patient cut
  - (overall): 27% reduction
- Core Tech Pilot: Increased nurse satisfaction; improved flow of materials from SPD to OR room
- Core Stock:
  - Freed up over $100,000 of stock in multiple locations by standardizing each area and use of group tech matrix
- CVT Service: Increased number of cases done each week by 10% or more
- Improved ordering process (simplified) for cultures taken during surgery to be sent for testing
- Heart Services Videotaped. Opportunities identified.
- Identified opportunity to reduce inventory by over 80% and convert it to vendor managed inventory



Metrics Board UP!
Developed New Tracking System (In House) Allows collection of “real” data in “real” time



Developed Group Tech Matrix to identify families of surgeries

Company X - Meeting Results - 2001

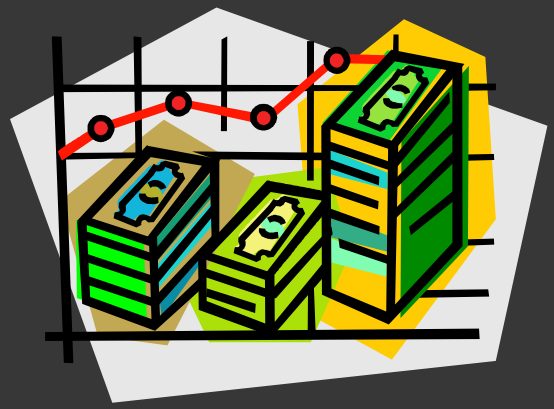
- Production meetings cut from 4 hours a week to 55 minutes
- Cut Finance meetings in ½, 2 ea. 1 hour meetings to 45 minutes
- BDT's meeting cut from 3 hours/week to 3 hours every other week
- Forecasting process cut from ¾ day to 2 hours
- HR cut meetings from 1 ½ hours to 1 hour.
- IT cut several meetings in ½ yielding 500 hours savings.

Total Annual Savings 4,578 hours

Typical Results Yielded through Lean

Up to:

- 90% through put time reductions
- 20-70% increases in productivity
- 90% reductions in inventory
- 95% reductions in Travel Distance
- 10% or more reduction in defects
- 30% reductions in overhead activities
- Significant returns on consulting fees

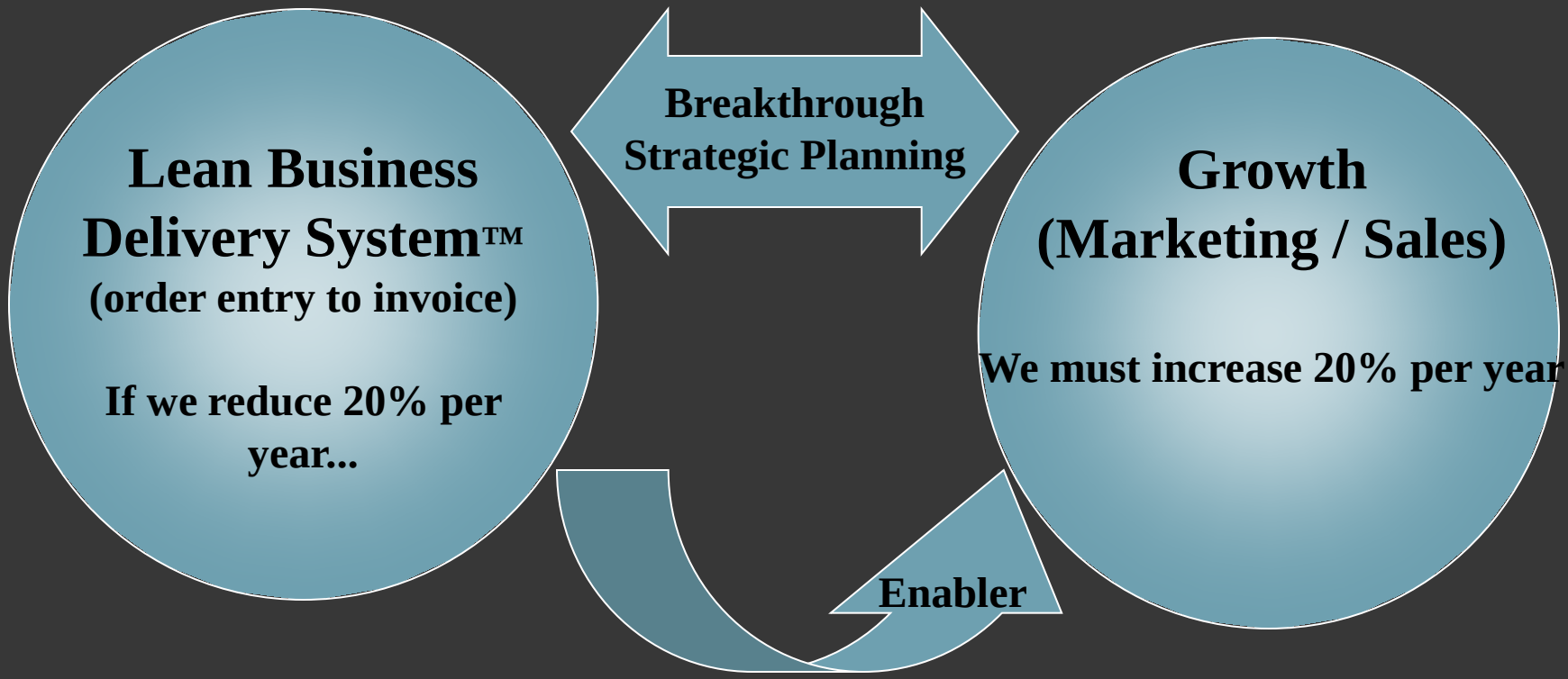


Anyone you dedicate to continuous improvement will pay for themselves 10X

Implementations Are Budgeted But Self Funding!

Lean and Growth

Business System from a Leadership Perspective



Creating a Vision
Operational Excellence
Lean Accounting

Creating a vision
Customer Value Positioning
Lean Acquisition

We must look at the overall business as a system!

Meet the ‘Laboratory Value Pyramid

- What path can clinical labs follow to respond to healthcare’s transformation?
- Introducing the concept of the **“Laboratory Value Pyramid.”**
- Provides lab leaders with a four-step road map from current state to ideal future state.
- Incorporates all concepts of modern business and quality management systems.

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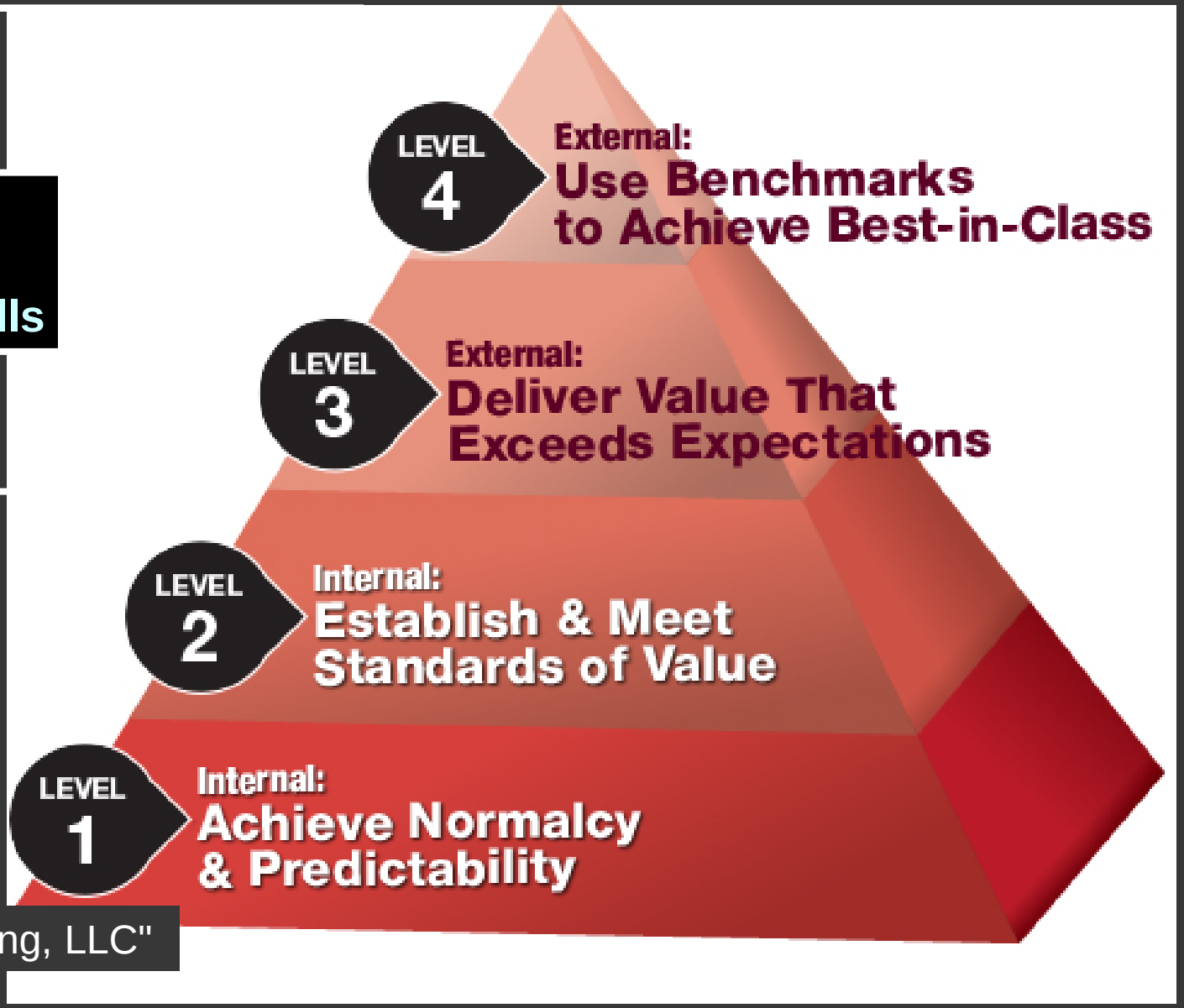
The Four Levels of the Lab Value Pyramid

Levels 3 & 4 are predominantly outside the lab walls

Levels 1 & 2 are predominantly within the lab walls



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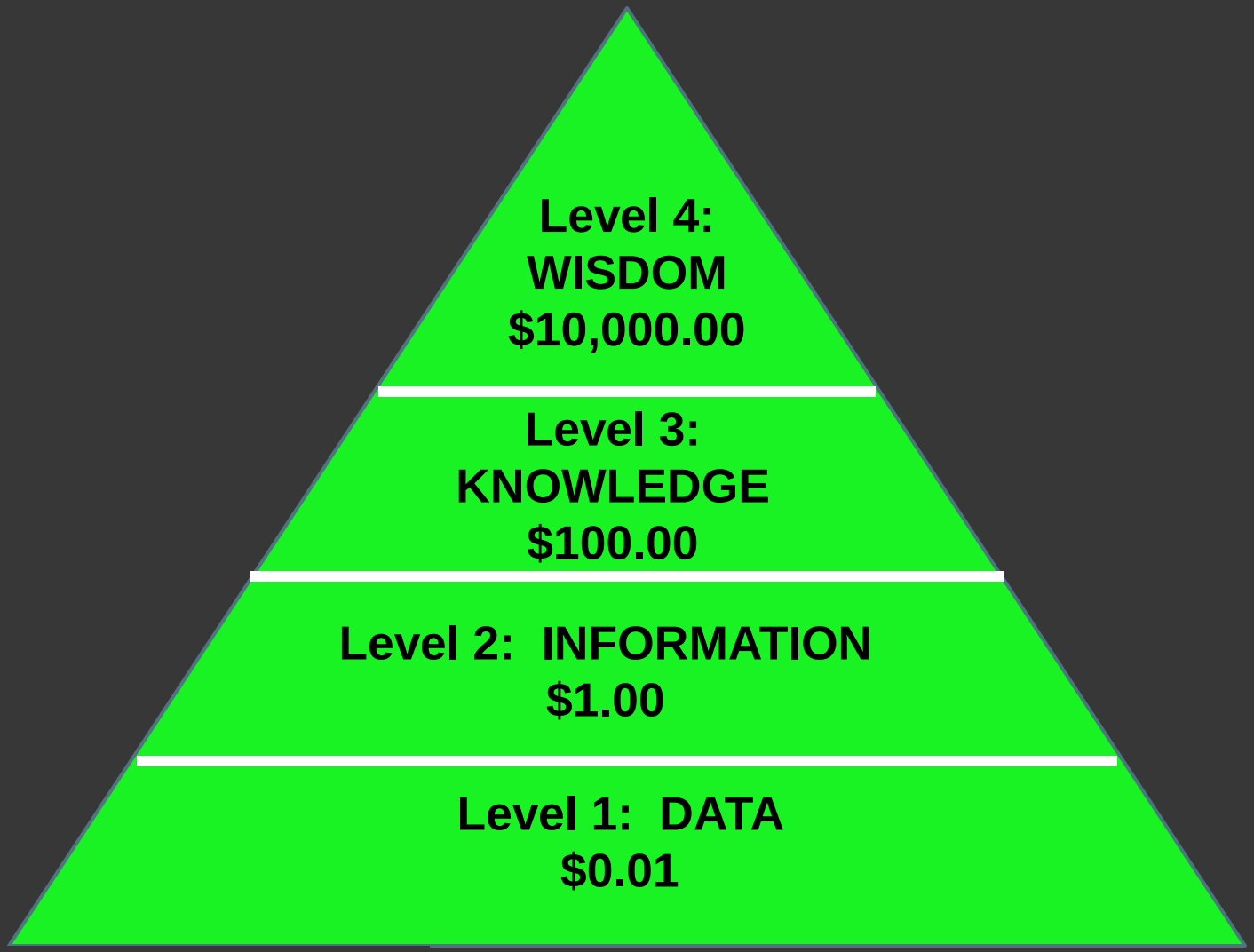
Relative $ Value of Lab's "Products" as a Lab Moves Up the Value Pyramid



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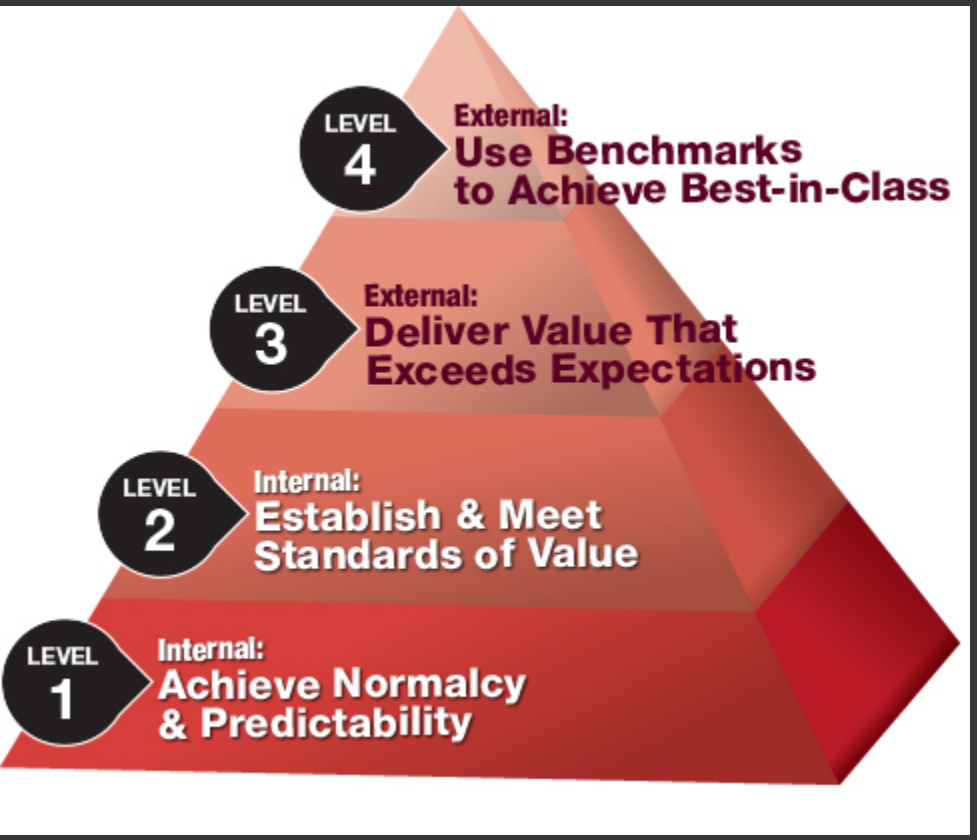
Level four: Use Benchmarks to Achieve Best-in-Class



- Your lab's practices and competencies are recognized as best-in-class by your peer groups and third party reviewers.
- You are consulting with other hospitals and systems to help them replicate what you have done within your institution.
- Your lab is recognized as among "the best in the business" because of how your lab team uses all the attributes from the first three levels.
- Examples of world-class labs can be found within prestigious institutions like Mayo, Stanford, Vanderbilt, MGH, Cleveland Clinic.
- Extra credit! Your lab has created the database structure that allows it to mine the value of lab test data.

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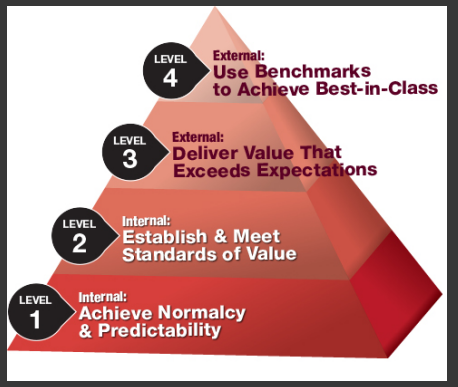
Four Ways to Grow Your Business



Lean Increase Your Productivity

Lean Increase Market Share

Lean New Product Development

Lean Lean Acquisitions

What Pyramid Level are these?
Lean Is And Enabler For All Of These!

Growth Strategy Questions

Increase Your Productivity

- How could we expand sales by developing faster delivery and better quality systems for customers?
- How elastic demand compared to our market price?

Increase Market Share

- How could we increase sales to the same customers with the same product mix?
- How could we extend the business by selling existing products to new customers ?
- How and where could we expand into new geographies?
- What can our company do better than any of its competitors in its current market?
- Can we catch up to or leapfrog competitors at their own game?

New Product Development

- How could we grow by introducing new products and services?
- What strategic assets do we need in order to succeed in the new market?
- Will we be simply a player in the new market or will we emerge a winner?

Lean Acquisitions

- How much could we grow by changing the industry structure through acquisition or alliances?
- What opportunities are there outside existing industry boundaries?
- Will diversification break up strategic assets that need to be kept together?
- What can our company learn by diversifying, and are we sufficiently organized to learn it?

Source: The Alchemy of Growth, Baghai, Coley, White, ©1999

Source: HBR Strategies for Growth, HBR Press, ©1998

The Three Platforms

1. Product ⟵ Most only focus here
2. Delivery
3. Service

Thinking Strategy

- Industry assumptions
- Strategic focus
- Customers
- Assets and capabilities
- Product and service offerings

We must think differently

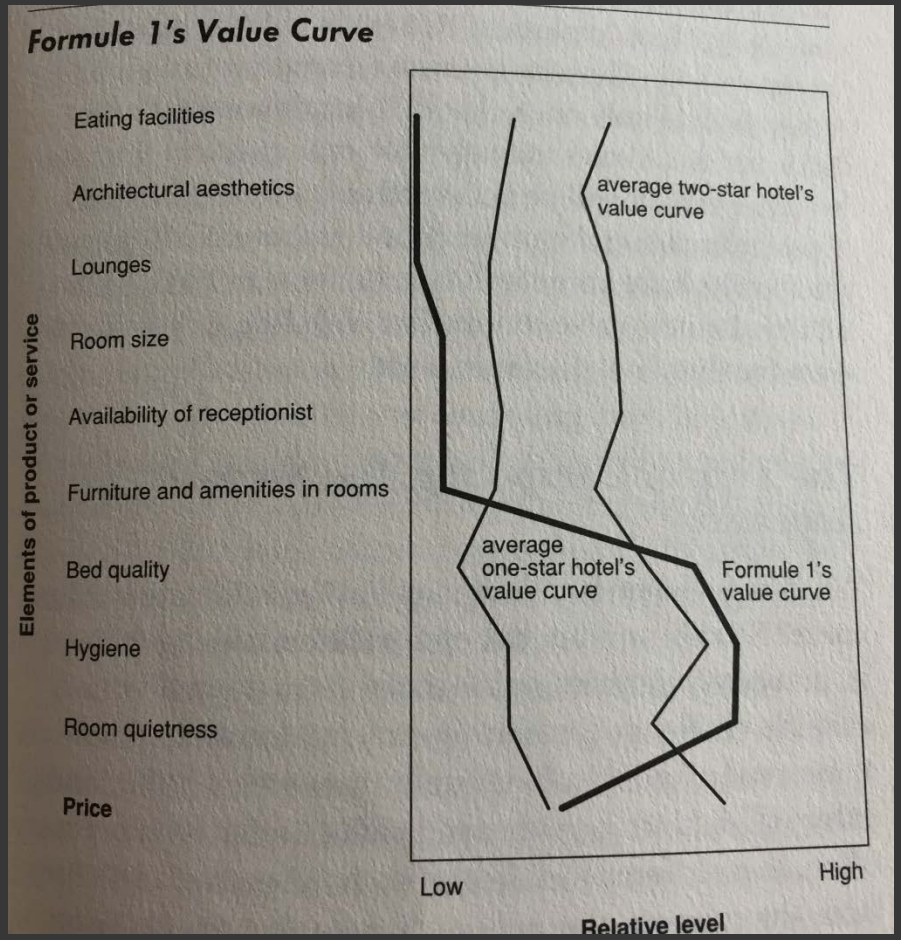
Source: HBR Strategies for Growth, HBR Press, ©1998

Two Strategic Logics

The Five Dimensions of Strategy	Conventional Logic	Value Innovation Logic
Industry Assumptions	Industry's conditions are given.	Industry's conditions can be shaped.
Strategic Focus	A company should build competitive advantages. The aim is to beat the competition.	Competition is not the benchmark. A company should pursue a quantum leap in value to dominate the market.
Customers	A company should retain and expand its customer base through further segmentation and customization. It should focus on the differences in what customers value.	A value innovator targets the mass of buyers and willingly lets some existing customers go. It focuses on the key commonalities in what customers value.
Assets and Capabilities	A company should leverage its existing assets and capabilities.	A company must not be constrained by what it already has. It must ask, What would we do if we were starting anew?
Product and Service Offerings	An industry's traditional boundaries determine the products and services a company offers. The goal is to maximize the value of those offerings.	A value innovator thinks in terms of the total solution customers seek, even if that takes the company beyond its industry's traditional offerings.

What is your value curve?

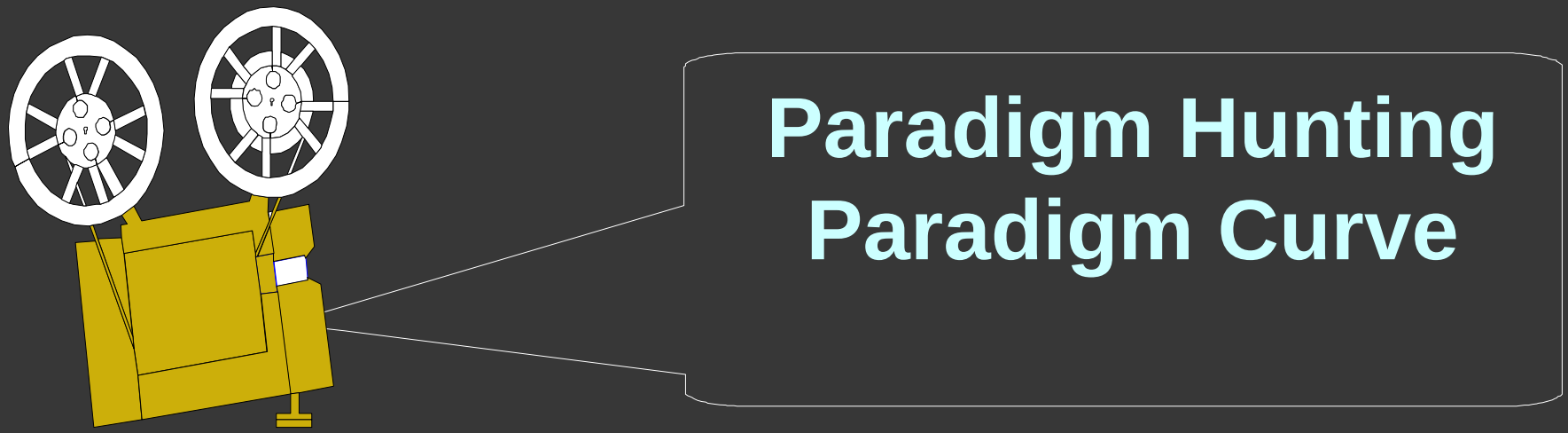
1. What can our company do better than any of its competitors in its current market?
2. What strategic assets do we need in order to succeed in the new market?
3. Can we catch up to or leapfrog competitors at their own game?
4. Will diversification break up strategic assets that need to be kept together?
5. Will we be simply a player in the new market or will we emerge a winner?
6. What can our company learn by diversifying, and are we sufficiently organized to learn it?



What is your growth strategy?
What is your value curve?
Where do you fit in the market?

Source: HBR Strategies for Growth, HBR Press, ©1998

What Are The New Lab Paradigms?



Group Exercise

1. **What is the current environmental climate in your field – regulations, payer models, technology etc.**
2. **What are some recent paradigm shifts in your field?**
3. **What are new paradigm shifts you could introduce in your field in the next 5 years?**

When a paradigm shifts, everyone goes back to ZERO!

Lean & Change

Lean = Paradigm Shift!

There will always be some resistance to change!

The Change Equation

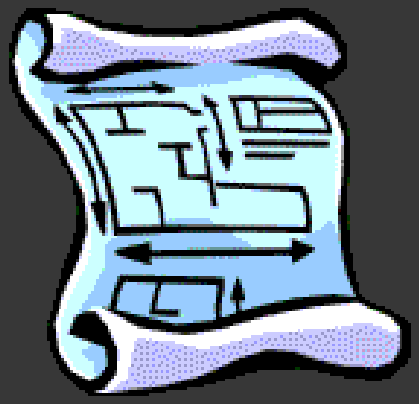
C x V x N x S > R

Do We Have a Compelling Need to Change?

- What is your through put time?
- What is your average TAT?
- How long does your patient wait for results?
- Do you have any waste in your process?
- Are you satisfied with your results?

What is Value Added for our Patients?

Why Change?



- What is the option?
- We are all interconnected but not typically measured that way

- Is your department “World Class?” What about all the departments you impact?
- How many of you are satisfied with your current processes? Did you create that process?

Success Breeds Complacency

Complacency Test

- When was the last time you made an improvement to your process?
- What is your average implemented suggestions per month from your employees?
- How often do you say “It can’t be done”, “Management won’t let me…”, “I can’t get money…” “We tried that before…”
- We don’t need to get any better…
- My Department’s metrics look great… What does it matter that we impacted the other department… That’s their problem!
- I’m tired of hearing about customer satisfaction issues… we know we have problems… we will fix them when we get that new facility with more beds and space”
- I can’t make any changes because…..

Are You Complacent?

Toyota Suggestion Rate is 4 Suggestions Per Month Per Employee
With a 96% Implementation Rate!

What People Want To Know

- What is the change?
- Why are we changing?
- How will it affect me?
  - Now? Future? Job? Personally?
- How will it affect the organization?
  - Now? Future?
- What's in if for me if I go along with the change?
  - Now? Future?
- What's in it for the organization?

Communication is essential!

Barriers to Implementing World Class

Having No Problems is a Problem

- I Can't …
- It Won't Work….
- I Already Know….
- Won't Work Here...
- Tried That Before…
- I Don't Want To Run It That Way…
- You Are Going To Do It Anyway...

The Only Limiting Factor Is Your Mind!

Most Loved Words

- What If We Could……
- What If We Tried……
- How Can We….
- I Know We Can….
- I Saw Someone Else Doing It..
- Why Didn't It Work The Last Time…
- When Was The Last Time We Tried….
- Maybe The Manufacturer Can Help Us…
- Let's Benchmark A Company That Is Doing That Way…
- Let's Take The Best From YOUR WAY And MY WAY And Make It OUR WAY…

Brainstorming is the TQ tool that overcomes the "I Can't" Syndrome?

How do You Sell Your Ideas?

When a paradigm shifts, everyone goes back to ZERO!

How to Create Standard Work

The Path To Sustainable Standard Work

TWI – JI – Job Breakdown

TWI – JM – Work Flow Analysis

Standard Work

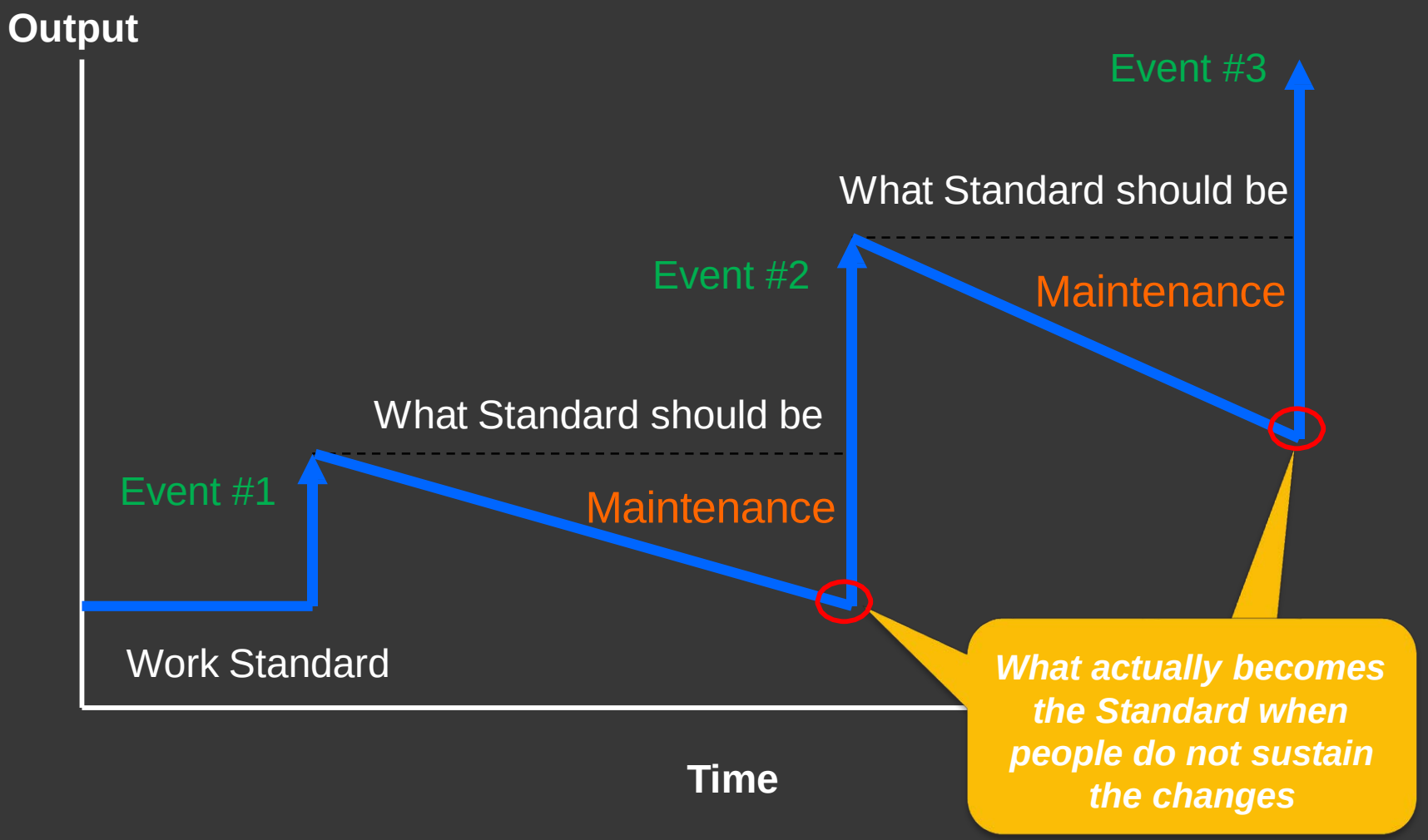
Standard Work Layered Audits

Leader Standard Work

Integrate into ISO Quality System

TWI, Layered Audits, and Quality System Integration Were the Missing Links In the Past

Impact of Tactical Lean

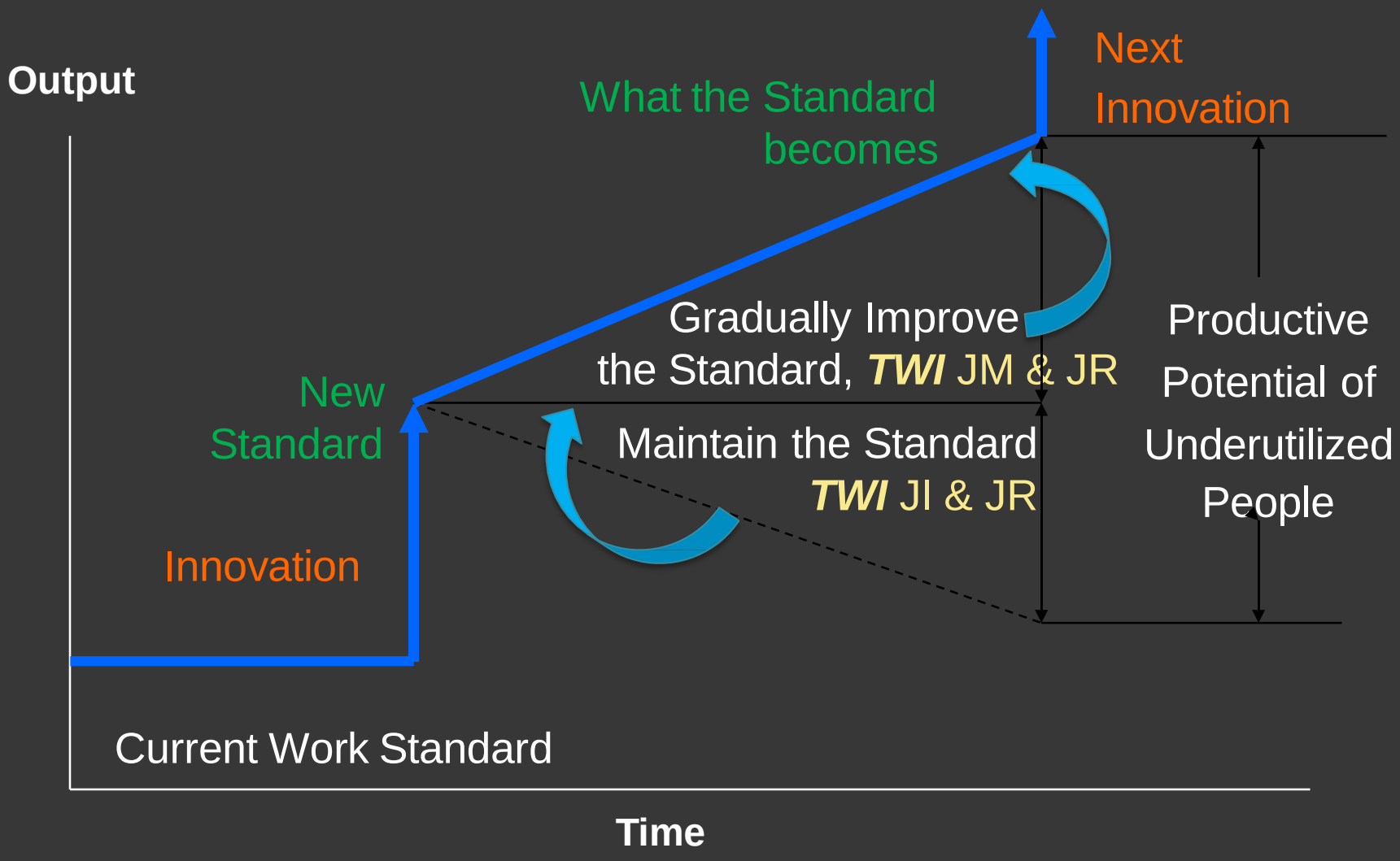


TWI – The Countermeasure

TWI provides a systematic approach to sustain changes and continuously improve by:

- Indoctrinates people into an “improvement” frame of mind
- Teaches people how to identify opportunities for improving their jobs
- Trains people how to generate ideas to take advantage of these opportunities
- Shows people how to get these ideas into practice right away
- Creates ownership for people to maintain standard work

TWI - The Missing Link to Lean & Kaizen



If you are not progressing you are regressing – Sir John Harvey Jones

Components of TWI

TWI Four Step Method for 'J' Programs				
Steps	**Job Instruction**	**Job Methods**	**Job Relations**	**Scientific Method**
1	Prepare the Worker	Break Down the Job	Get the Facts	Observations: Define the problem & parameters
2	Present the Operation	Question Every Detail	Weigh & Decide	Hypothesize: Suggest a possible explanation or solution
3	Try-out Performance	Develop the New Method	Take Action	Testing: Collect information (data) & test hypothesis
4	Follow-Up	Apply the New Method	Check Results	Results: Interpret the results of the test to see if hypothesis was correct

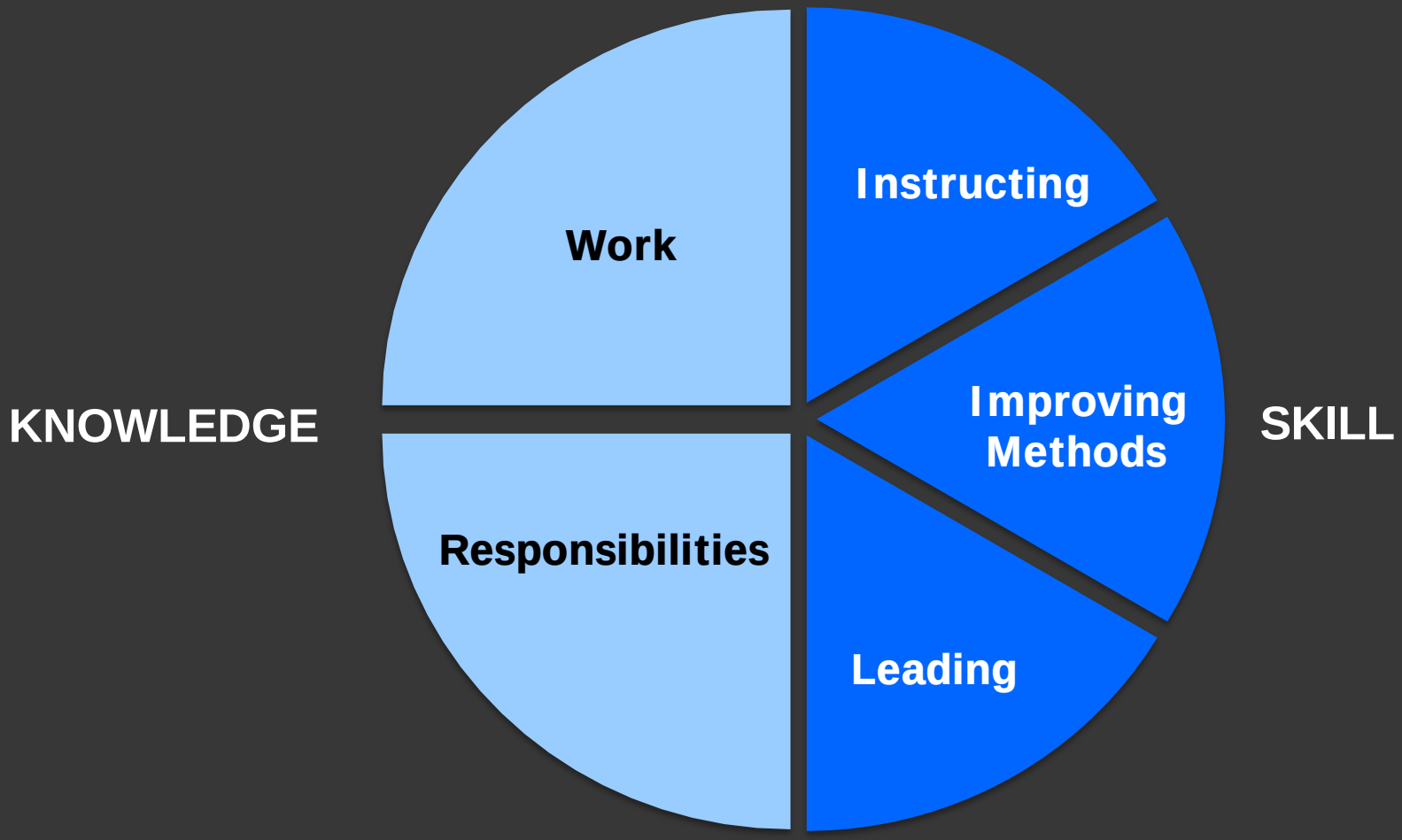
This four-step methodology was also the basis for the development of STANDARD WORK & KAIZEN.

Benefits of TWI

- Get more done with less equipment and manpower
- Improve quality, reduce errors by achieving standard work across workers and shifts
- Reduce safety incidents
- Decrease training time, especially for temporary workers
- Reduce labor hours
- Reduce grievances
- Transfer knowledge from a skilled workforce to an unskilled or green workforce

Companies that have implemented TWI have reported improvements of 25% and more in increased production, reduced training time, reduced scrap and reduced labor-hours.

5 Needs Model for Good Supervisors



Good Supervisors have always realized that they have five needs.

The Four Steps of TJI

Step 4: FOLLOW UP

Step 1: PREPARE WORKER

Step 3: TRY OUT PERFORMANCE

Step 2: PRESENT OPERATION

Job Instruction Card

HOW TO INSTRUCT

STEP 1 – PREPARE THE WORKER

- Put the person at ease
- State the job
- Find out what the person already knows
- Get the person interested in learning the job
- Place the person in the correct position

STEP 2 – PRESENT THE OPERATION

- Tell, show and illustrate - one **Important Step** at a time
- Do it again – stress **Key Points**
- Do it again – explain **Reasons**

Instruct clearly, completely, and patiently
Present no more than they can master at one time

STEP 3 – TRY OUT PERFORMANCE

- Have the person do the job – correct errors
- Have the person explain each **Important Step** to you as the job is done again
- Have the person explain each **Key Point** to you as the job is done again
- Have the person explain each **Reason** to you as the job is done again

Make sure the person understands
Continue until YOU know THEY know

STEP 4 – FOLLOW UP

- Put the person on his own
- Designate to whom the person goes for help
- Check on the person frequently
- Encourage questions
- Taper off extra coaching and close follow-up

IF THE WORKER HASN'T LEARNED
THE INSTRUCTOR HASN'T TAUGHT

JOB INSTRUCTION

HOW TO GET READY TO INSTRUCT

Before instructing people on how to do a job:

1. **MAKE A TIME TABLE FOR TRAINING**
   Determine **who** to train…
   For **which work**…
   By **what date**.

2. **BREAK DOWN THE JOB**
   List **Important Steps**
   Pick out **Key Points**
   Safety factors are always Key Points
   State **Reasons**

3. **HAVE EVERYTHING READY**
   The proper equipment, tools, materials and whatever needed to aid instruction

4. **ARRANGE THE WORK AREA**
   Neatly, just as in actual working conditions

Job Instruction Motto

"If the worker hasn't learned, the instructor hasn't taught."

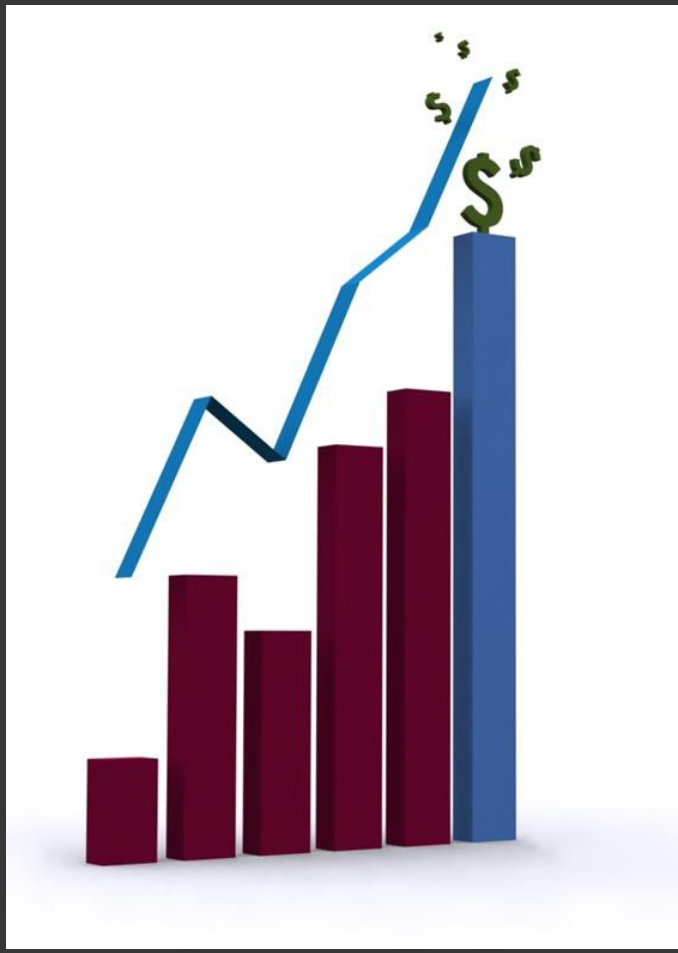
Just Showing vs. Telling vs. Illustrating

Example of Job Breakdown Sheet

MAJOR STEPS	KEY POINTS	REASONS
1. Untwist and straighten	1.1 6 inches	1.1.1 Quality standard
2. Make right hand loop	2.1 In front of main strand	2.1.1 In order to make correct tie
3. Make left hand loop	3.1 Pull towards you	3.1.1 To make it easier to move to next motion
	3.2 Put a kink in wire	3.2.1 To make it easier to move to next motion
	3.3 Under stub	3.3.1 In order to make correct tie
	3.4 Behind main strand	3.4.1 In order to make correct tie
4. Put end through loop		
5. Pull taut	5.1 Ends even	5.1.1 Even tension in loops
	5.2 Knot snug	5.2.1 Correct positioning of knot

Results from JI Training

- Reduced training time
- Fewer accidents
- Less mistakes and errors
- Less equipment damage
- Increased job satisfaction
- Improved quality
- Increased profits
- Direct Linkage to Standard Work



Analyze The Operator – Yellow Belt

Full Work Analysis

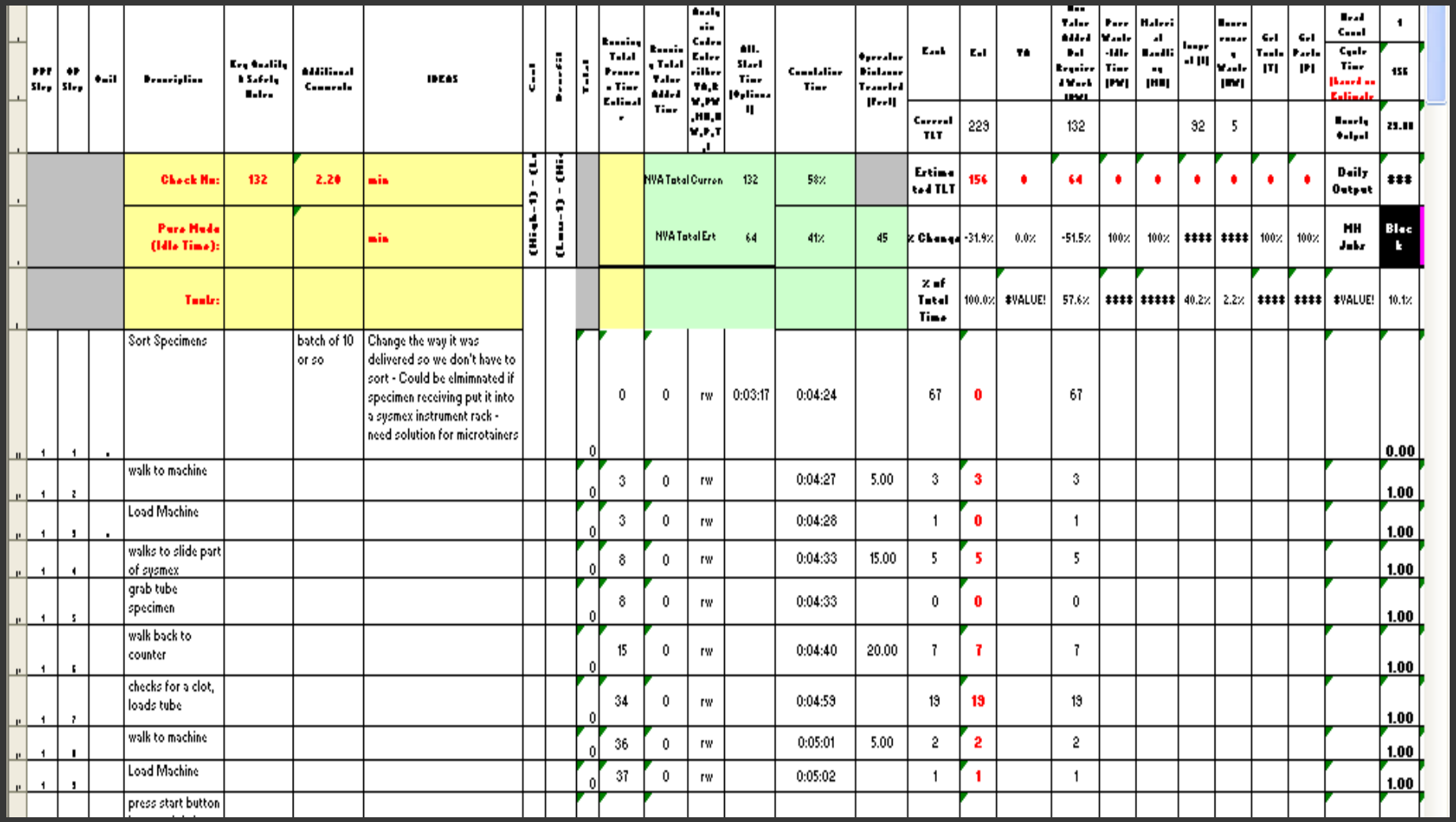
- 1. Value Added
- 2. Non-Value Added

What is "World Class?"

Quality First….
The Speed Will Come!

The Power of Video Analysis

Operator Work Flow Analysis



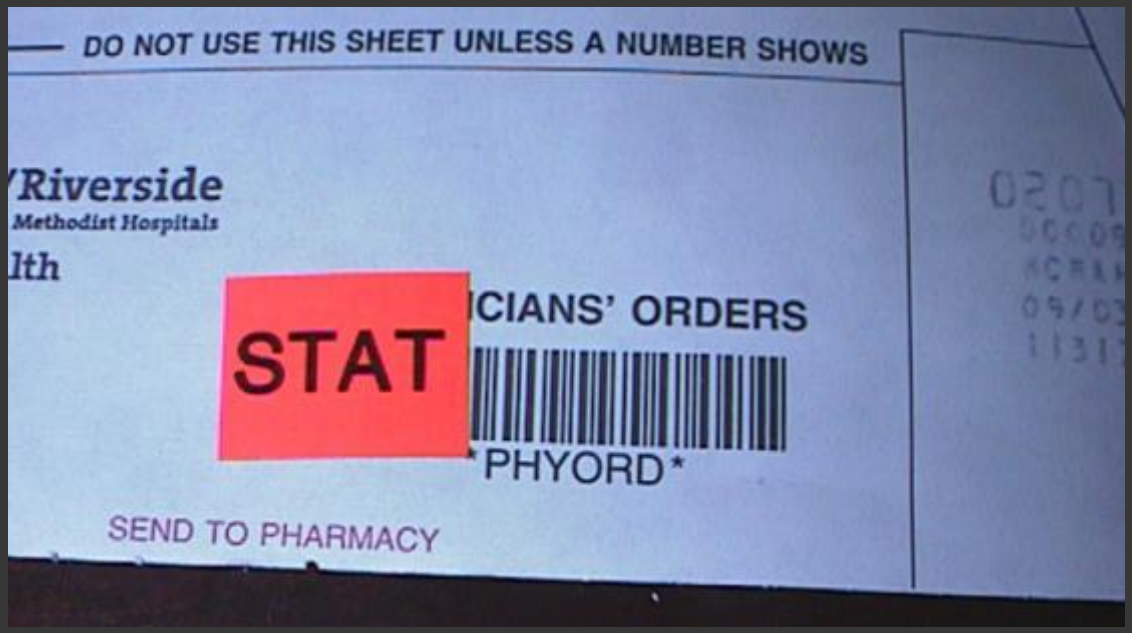
PPT Step	OP Step	Omit	Description	Key Quality & Safety Notes	Additional Comments	IDEAS	Cost	Benefit	Total	Running Total Process Time Estimate	Running Total Value Added Time	Analysis Codes Enter either VA,BW,PW,MH,BW,P,T or I	All. Start Time [Optional]	Cumulative Time	Operator Distance Traveled [Feet]
			Check No:	132	2.20	min	(High-1) - (L	(Low-1) - (Hi			NVA Total Curren		132	58%	
			Pure Mode (Idle Time):			min					NVA Total Est		64	41%	45
			Tools:												
1	1	.	Sort Specimens		batch of 10 or so	Change the way it was delivered so we don't have to sort - Could be elminated if specimen receiving put it into a sysmex instrument rack - need solution for microtainers			0	0	0	rw	0:03:17	0:04:24	
1	2		walk to machine						0	3	0	rw		0:04:27	5.00
1	3	.	Load Machine						0	3	0	rw		0:04:28	
1	4		walks to slide part of sysmex						0	8	0	rw		0:04:33	15.00
1	5		grab tube specimen						0	8	0	rw		0:04:33	
1	6		walk back to counter						0	15	0	rw		0:04:40	20.00
1	7		checks for a clot, loads tube						0	34	0	rw		0:04:59	
1	8		walk to machine						0	36	0	rw		0:05:01	5.00
1	9		Load Machine						0	37	0	rw		0:05:02	
			press start button												

Eval	VA	Non Value Added But Required Work [PW]	Pure Work -Idle Time [PW]	Material Handling [MH]	Inspect [I]	Unnecessary Work [BW]	Get Tools [T]	Get Parts [P]	Head Count	1
Current TLT	229		132			32	5			Cycle Time [based on Estimate	156
Estimated TLT	156	0	64	0	0	0	0	0	0	Hourly Output	25.00
% Change	-31.9%	0.0%	-51.5%	100%	100%	####	####	100%	100%	Daily Output	###
% of Total Time	100.0%	#VALUE!	57.6%	####	#####	40.2%	2.2%	####	####	MH Jobs	#VALUE!
											10.1%
			67	0							0.00
3	3		3								1.00
1	0		1								1.00
5	5		5								1.00
0	0		0								1.00
7	7		7								1.00
19	19		19								1.00
2	2		2								1.00
1	1		1								1.00

How to Analyze Videos

What Is Standard Work

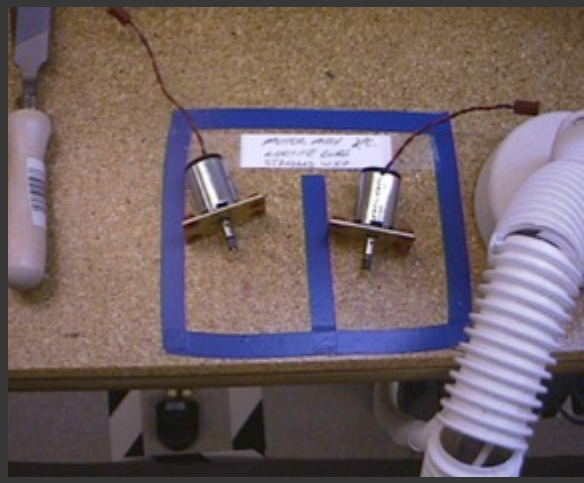
- Sequence of Operations
- Cycle Time
- Standard Work In Process



Standard Work In Process (WIP)

Standard WIP refers to the minimum inventory within a process or product line, needed for operations to proceed safely at the required cycle time.

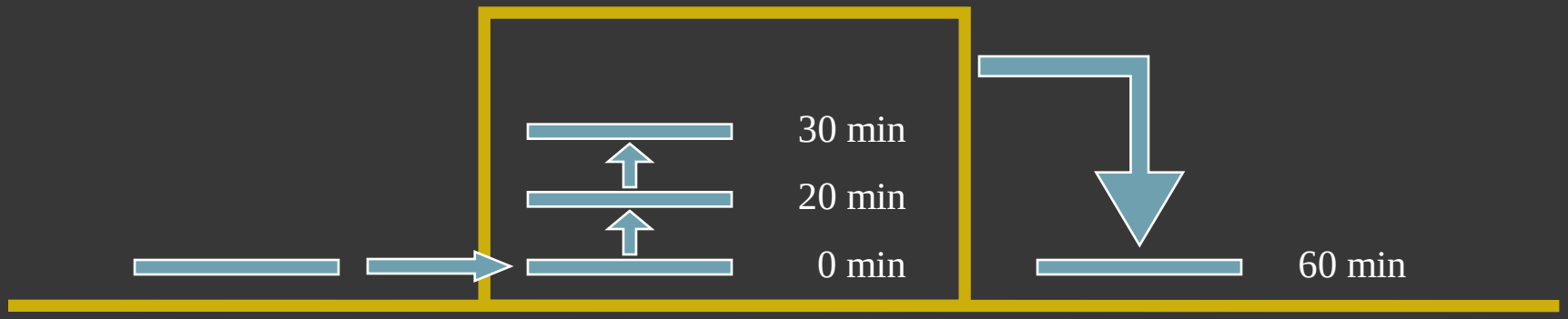
- Calculated by adding the number each operator requires plus what is mounted in or on machines.
- Includes inventory needed to perform a job safely (i.e. cool down from an oven).
- Does not include excess inventory placed between operators due to defective processes or for convenience to balance a line.



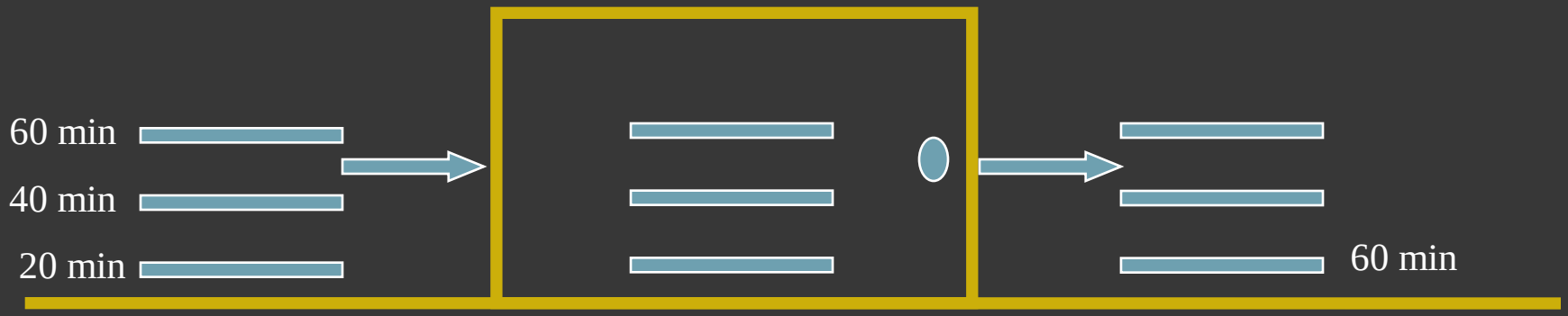
Standard Work In Process (WIP)

Interruptible

Oven Time = 60 minutes
Cycle Time = 20 minutes



Not Interruptible



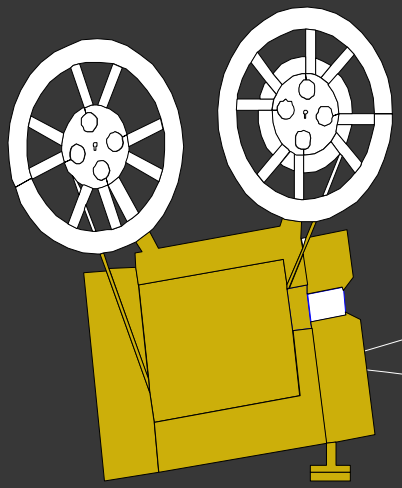
Registration Standard Work Example

Operator Standard Work Form

Standard Work Area: Lab Registration: Stat Labeling the Tube for Lab Processing

Job Step #	Operation Description (what they do)	Key Points and Quality Notes (how they do it)	Reasons for Key Points	Time	Cum Time
1	Take tubes, labels, and caps out of bags			3.0	3.0
2	Place testing label on tube per visual sample on this form	It is very important that the label be 2 inches from the bottom of the tube in order for the testing machines to read the labels.	If the label is more than 1/8 inch off in either direction, it cannot be read.	3.0	6.0
3	If it is a Stat tube, then place a red sticker directly above the test sticker and under the cap.	There needs to be a ¼ inch clearance between the stat label and the cap and the stat label and the testing sticker.	If not the machine will not pick it up as a stat tube.	4.0	10.0
4	If the tube has a number on the bottom, record the time on the strip provided and place it in the tube.	if there are multiple tubes per bag, then these steps must be completed until all the tubes are in the bag.	If not then some of the tubes may not be processed properly	5.0	15.0
5	Place cap on top of the tube			3.0	18.0
6	Put tube back in the bag			3.0	21.0
7	Deliver the bag to processing			5.0	26.0

Video



Video on Cleaning Cassettes

Standard Work Improvements

Operator Standard Work Form

See Policy and Procedures for more detail as necessary

Rev None 11/3/04

Standard Work: Clean Cassettes Sysmex Comparisons		# Tubes	Baseline	Projected Lean	Take 2 Actual Post Lean	Percent Saved From Take 1
Job Step #	Operation Description	Key Points	Time	Time	Time	
1	Grab red container from right side of stainer	Holds 42 cassettes	2	2	1	
2	Walk tosink		10	10	6	
~~3~~	~~Put down container~~		2	0	0	
4	Grab methanol		12	12	8	
5	Flooding container	Fill to top of cassette and ensure cassettes	36	36	37	
~~6~~	~~Put bottle down and replace cap~~		3	3	0	
~~7~~	~~Moved bottle to side~~		4	0	0	
8	Place cover on container to prevent vapor	Wait at least 5 minutes	6	6	6	
9	Remove cover		2	2	5	
10	Grab waste bottle, remove cap, insert funnel, and place in sink		7	7	5	
11	Pour methanol into waste container		24	24	21	
12	Remove funnel, replace cap, and put waste bottle back		8	8	6	
~~13~~	~~Move cover to blue container~~		2	0	0	
14	Carry red container to machine		7	7	7	
15	~~Dump cassettes into white basket lined with~~ paper towels to drain cassettes		4	2	0	
16	Place white container and red container on right side of stainer		6	2	6	
	Total		135	121	108	20%

Standard Work Audit Form

At First Glance:	1. Are multiple boxes / trays / cartons labeled and built?	If **YES**...STOP and Review process with line leader to eliminate batching.	2. Is Standard Work Posted and Visible?	If **NO**... STOP: reprint, and post visibly at work station, inform operators.	3. Is the operator bumping properly?	**Target Time:**
Requirements: PC, Label Printers, Materials, Processed work orders	☐ YES ☐ NO		☐ YES ☐ NO		☐ YES ☐ NO	**01:25**

Station:	Sequence of Operations (Steps They Do)	Check	Key Points	Reasons for Key Points	Time	Cumulative Time
1	Take form from Inbox				10	
2	Identify Labels Needed				3	
3	Open Correct Program				4	
4	Scan Form				3	
5	Check to make sure the right labels are in the printer				2	
6	Changeover labels if necessary		varies if needed from 30-1 minute		30-60	
7	Go into Filler				5	
8	Print the label				10	
9	Put Label in bag				2	
10	Refer to packet, match model number to label				5	
11	Initial form confirming label was printed				2	
12	Repeat steps 5-11 with other labels		Could Vary based on how many lables (1-2 minutes)			
13	Once all labels in bag, clip to sales order				5	
14	Place order into appropriate bin on scheduling center		Engraved, Non-Engraved		4	
				Total Time:	85-115	

Cycle #1 Time (mm:ss)	If Cycle Times are Greater Than 2 or more times... Use stopwatch
	Greater Than
	Less Than
Cycle #2 Time (mm:ss)	
	Greater Than
	Less Than
Cycle 3 Time (mm:ss)	
	Greater Than
	Less Than

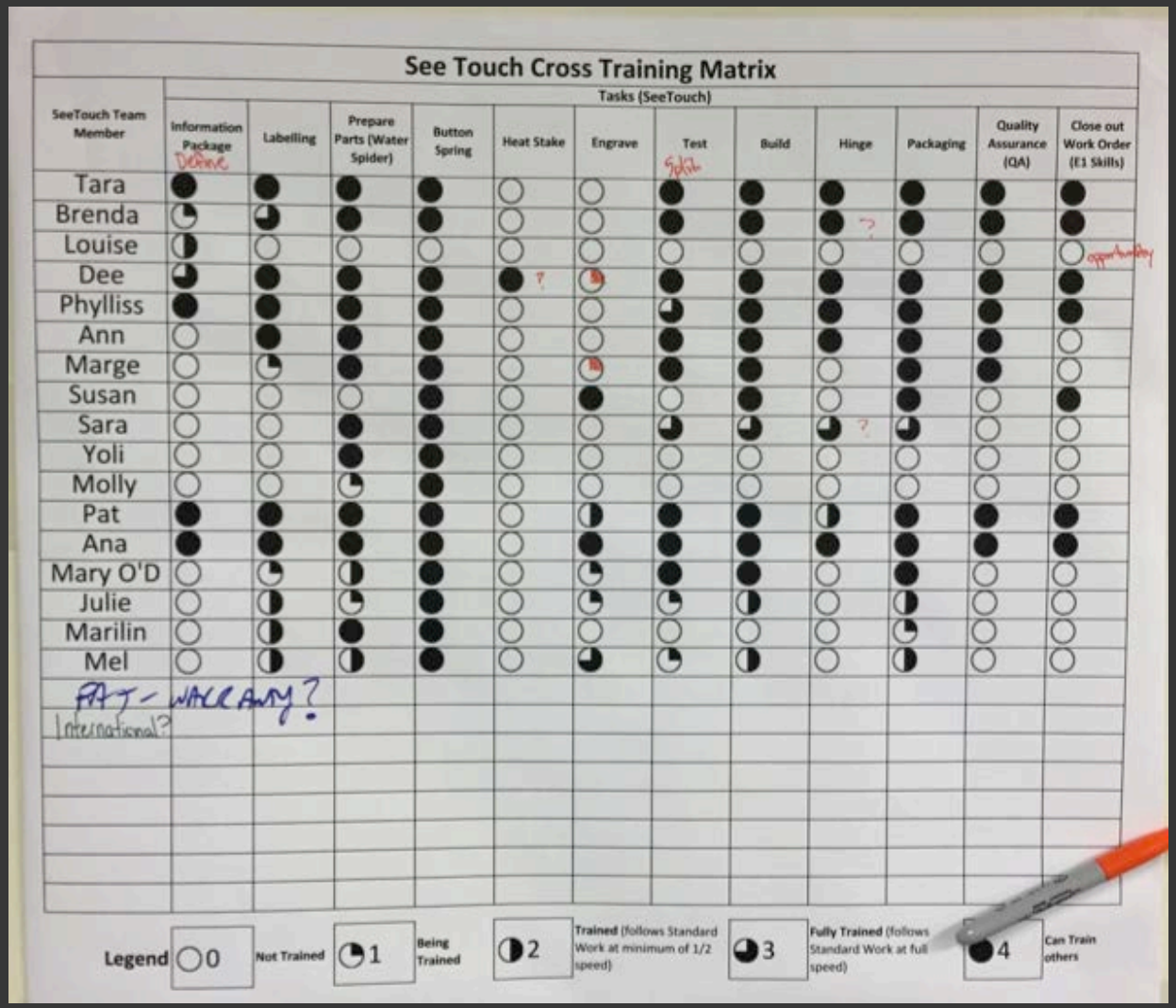
Observations:

Operator Comments:

Ideas:

Should be Posted in the Work Cell for Each Station

Cross Training Matrix Example



See Touch Cross Training Matrix

SeeTouch Team Member	Tasks (SeeTouch)											
	Information Package	Labelling	Prepare Parts (Water Spider)	Button Spring	Heat Stake	Engrave	Test	Build	Hinge	Packaging	Quality Assurance (QA)	Close out Work Order (E1 Skills)
Tara	●	●	●	●	○	○	●	●	●	●	●	●
Brenda	◔	◕	●	●	○	○	●	●	●	●	●	●
Louise	◑	○	○	○	○	○	○	○	○	○	○	○
Dee	◕	●	●	●	●	◔	●	●	●	●	●	●
Phylliss	●	●	●	●	○	○	◕	●	●	●	●	●
Ann	○	●	●	●	○	○	●	●	●	●	●	○
Marge	○	◔	●	●	○	◔	●	●	○	●	●	○
Susan	○	○	○	●	○	●	○	●	○	●	○	●
Sara	○	○	●	●	○	○	◕	◕	◕	◕	○	○
Yoli	○	○	●	●	○	○	○	○	○	○	○	○
Molly	○	○	◔	●	○	○	○	○	○	○	○	○
Pat	●	●	●	●	○	◑	●	●	◑	●	●	●
Ana	●	●	●	●	○	●	●	●	●	●	●	●
Mary O'D	○	◔	◑	●	○	◔	●	●	○	●	○	○
Julie	○	◑	◔	●	○	◔	◔	◑	○	◑	○	○
Marilin	○	◑	●	●	○	○	○	○	○	◔	○	○
Mel	○	◑	◑	●	○	◕	◔	◑	○	◑	○	○

PAT - WALK AWAY?

International?

Legend ○0 Not Trained; ◔1 Being Trained; ◑2 **Trained** (follows Standard Work at minimum of 1/2 speed); ◕3 **Fully Trained** (follows Standard Work at full speed); ●4 Can Train others

Ties to TWI Training Plan

Four Elements of Lean Management

Four Elements of	Lean Management
1. Leader standard work	• Standards enable improvement
2. Visual controls	• Make problems visible • Go see
3. Daily accountability process	• Stop and fix • Everybody solves problems
4. Leadership discipline	• Leaders as people developers

This Is How You Sustain Lean

Who Should Have Standard Work?

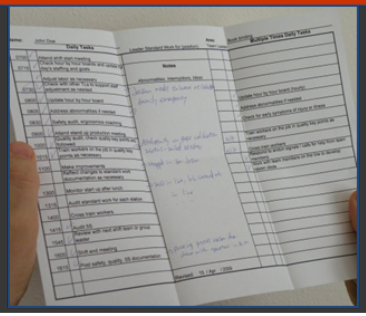
ROLE	% of Work (time) that should be Standard
General Manager	10-15%
Core Team	25%
Superintendents	50%
Supervisors	50%
Utilities/ support	80%
Operators (Associates)	95+%

In a Lean Organization, EVERYONE!

What is Leader Standard Work?

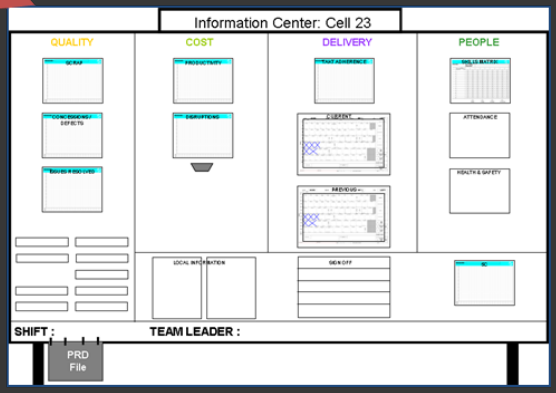
There is no Standard Template

1. Leader Standard Work



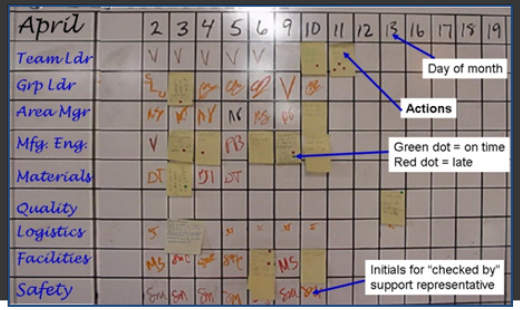
Who, what, when to check

2. Visual Displays & Controls



Highlight Problem Areas

3. Daily Accountability Process



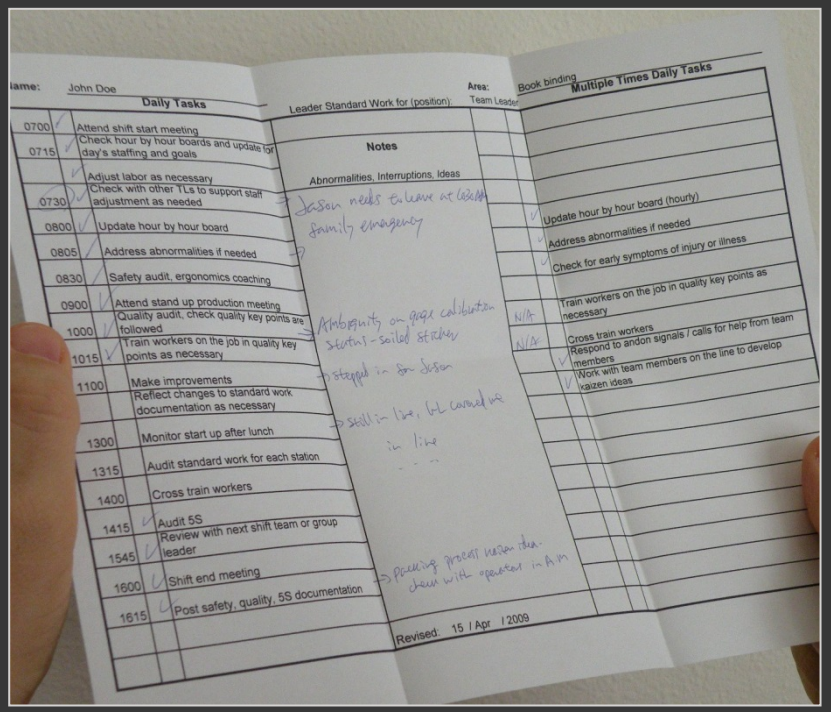
Ensure we checked and acted

4. Discipline

Lead by example

Leaders Standard Work - Elements

- **Task Section**
  - Once Daily Tasks
  - Multiple Times per Day Tasks
  - Weekly or Monthly Tasks
- **Meeting and Metric Sections**
  - Required meetings
  - Tracking metrics
- **Notes Sections**
  - Notes (to note flow interrupters)
  - Assignments (to note specific tasks for self or others)
  - Improvements (o note improvement ideas or projects)



Be Patient With The Process But Inpatient With The Results!

Leader Standard Work - Example

Follow-up / Notes

Countermeasure Notes

Mitch

Daily	
Reason check couldn't be completed	
Replace Day by Hour Sheets	
Update % and Late $ in Hall	
Adjust Orders on Heijunka Rack by Hour	
Enter in Month By Day	
Timesheets	
Supervising Cells and Soliciting Ideas	
Prep for QDIP Meeting	
Conduct +QDIP Meeting	
Order Supplies	
Round Assy Cells & Shipping Work on Countermeasures Work on CI Work on Safety / Lean Sheet	
Check on Expedited Shipments	

Focus Factory 2 Check	
Reason check couldn't be completed	
Safety (see reverse)	
Lean Sustain (see Reverse)	

Mitch

Daily						
Task	Times	WK 1	WK 2	WK 3	WK 4	WK 5
Replace Day by Hour Sheets	7:00 – 7:15					
Update % and Late $ in Hall	7:15 – 7:20					
Adjust Orders on Heijunka Rack by Hour	7:20 – 7:30					
Enter in Month By Day	7:30 – 7:45					
Timesheets	8:00 – 8:15					
Supervising Cells and Soliciting Ideas	8:15 – 9:45					
Prep for QDIP Meeting	9:45 – 10					
Conduct +QDIP Meeting	10 – 10:10					
Order Supplies	10:10 – 10:30					
Round Assy Cells & Shipping Work on Countermeasures Work on CI Work on Safety / Lean Sheet	10:10 – 3:30					
Check on Expedited Shipments	3:30 – 4:30					

Assembly Cells Over view					
	WK 1	WK 2	WK 3	WK 4	WK 5
Safety (see reverse)					
Lean Sustain (see Reverse)					

Month: May 2011

Monday

Leader Standard Work - Example

Monday

Safety/ TPM Check Point Details

Daily

- ❑ Make sure area is free of trip hazards
- ❑ Make sure trash is emptied in each cell
- ❑ Check scrap against scrap boards and put on scrap table
- ❑ Electrical Panels & Fire Extinguishers Unblocked
- ❑ Make sure extra parts are returned to the stockroom
- ❑ Operators wearing proper PPE

Weekly

- ❑ Check fluids in Shipping Bagger

Lean Check Point Details

Daily

- ❑ Make sure operators are following standard work
- ❑ Make sure trash is emptied in each cell
- ❑ Check scrap against scrap
- ❑ Ask operators for improvement ideas
- ❑ Write down implemented ideas in Idea Tracking Book

  (Take before and after pictures)
- ❑ Update QDIP board with any productivity or safety issues or unsolved root causes for countermeasures

Weekly

- ❑ Film one part in 05 Cell
- ❑ Update standard work for 05 Cell
- ❑ Implement one idea in 05 Cell

Capacity Analysis

Production Smoothing / Tact Time

Customer Demand = 21,000 Tubes/ Week
= 3,000 / Day

TT = Available Time / Customer Demand

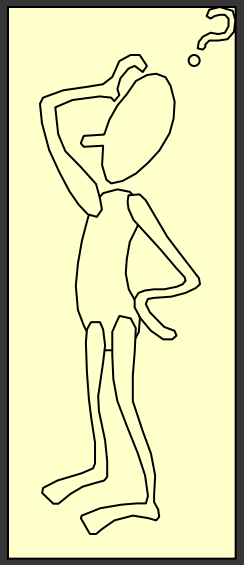
Available Time = $\frac{1440 \text{ min/day}}{3{,}000 \text{ /day}}$

= 28.8 seconds
This is equal to:
Approx 2 tubes per minute

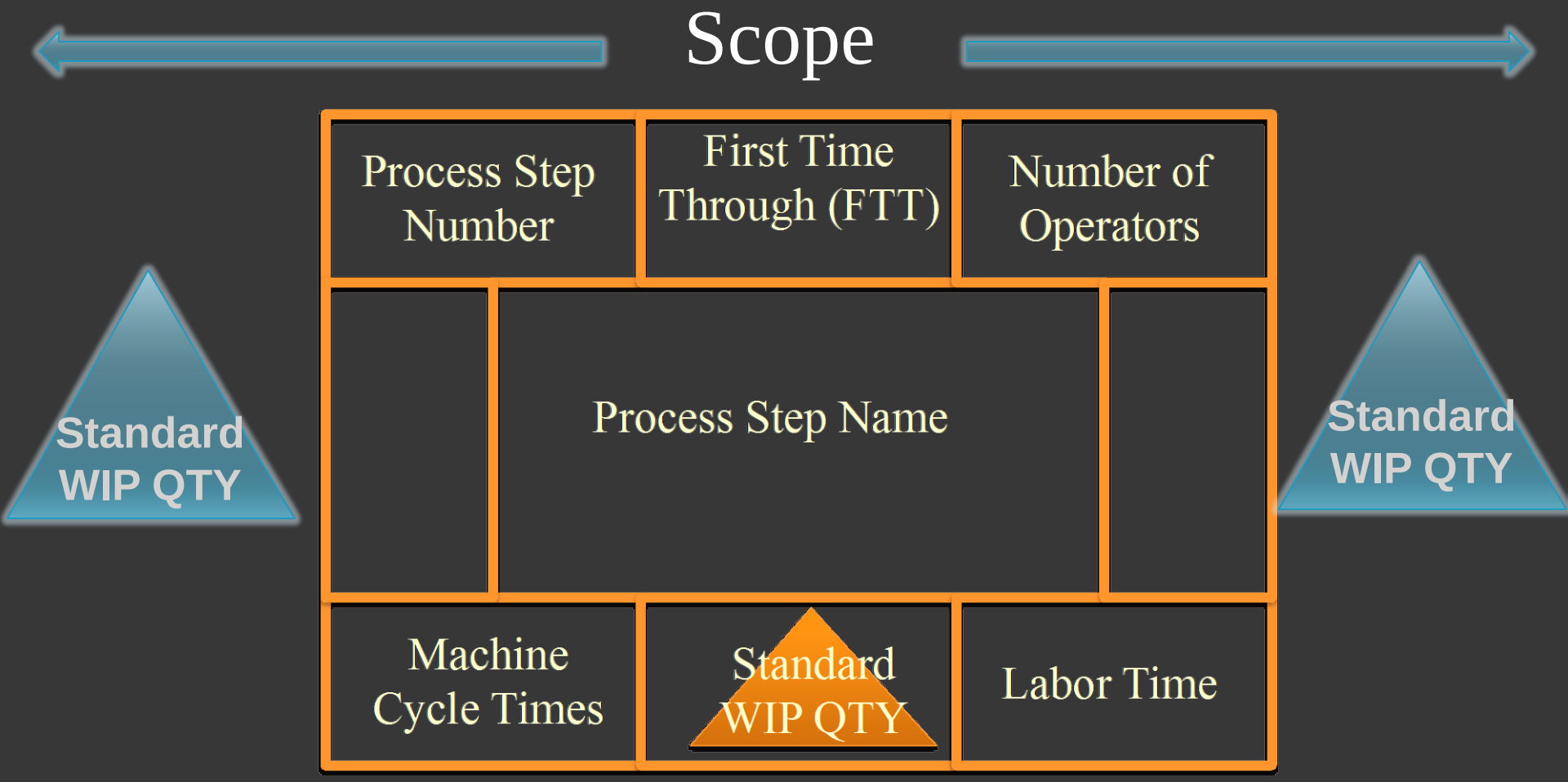
Process Block Diagram

Why construct a Process Block Diagram?

- To promote a common understanding of the process (allow everyone to see the process)
- To validate everyone is using the same process
- To uncover the “Hidden Factory”
- To spot Quick Wins
- To identify other NVA (Non Value Added) Opportunities

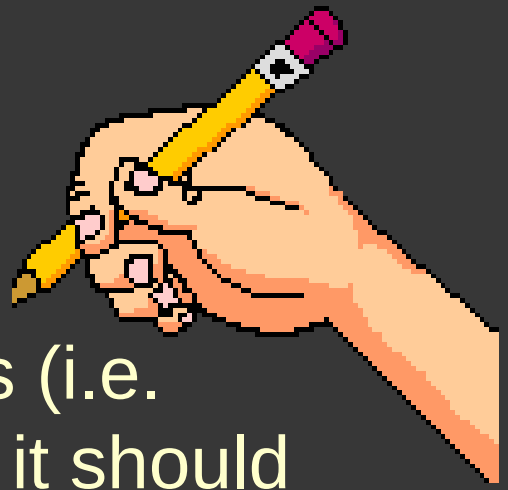


Process Block Diagram



Exercise: Draw a PBD for Your Process

Successful Process Block Diagrams



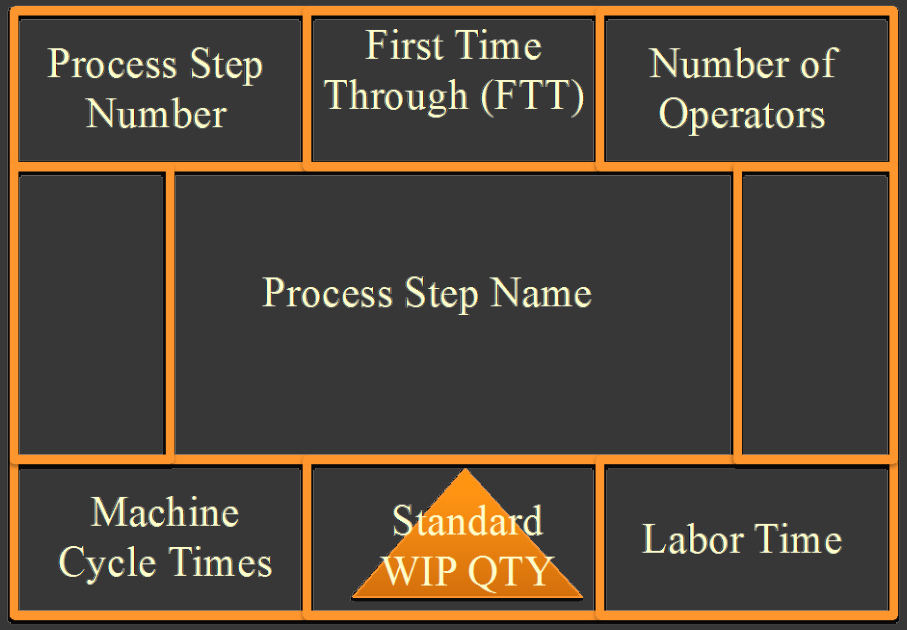
- Walk through the current process
- Record the process steps observed
- Depicts the process the way it works (i.e. current state), not the way you think it should work (i.e. perceived state), nor the way you would like it to work (i.e. future state).
- Initiate the Process Block Diagram (PBD)
- Update the PBD with meaningful process level data (e.g. times, yields, etc)

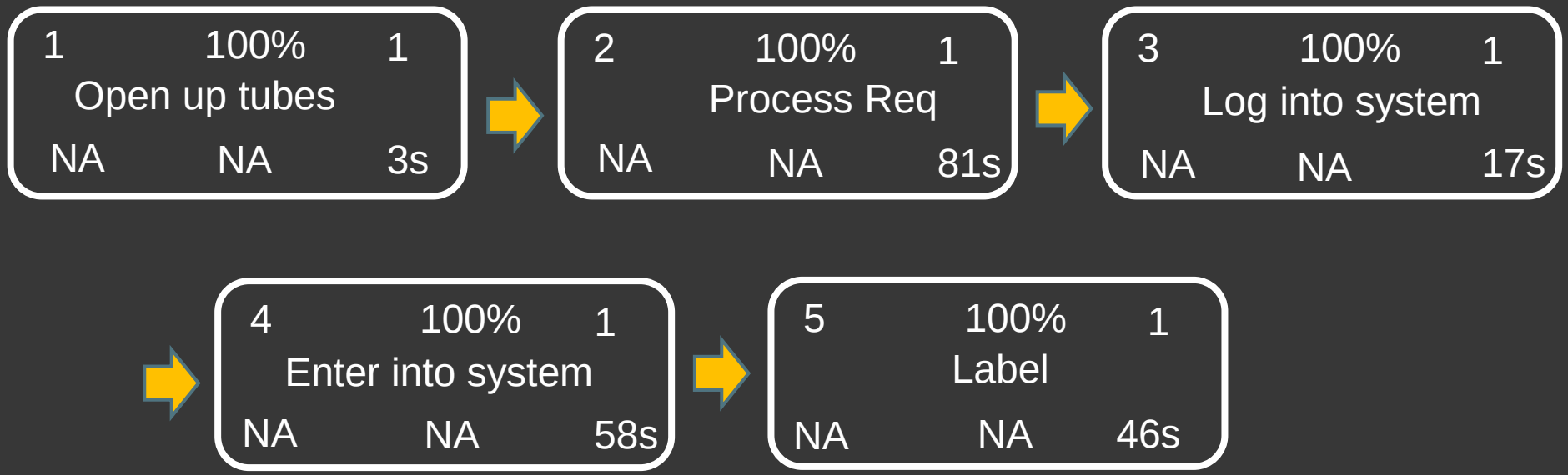
PPCS Lab Registration Example

Part No:		Lab Registration	Time Summary
Description:		Lisa 8/6/02	
Step No.	**Description**	**Comments**	**205.7**
1	pick up specimen bag	toggle to HBOC	2
2	toggle to HBOC	pick up specimen bag	1
3	Remove req from specimen bag, unfold req	Remove req from specimen bag, unfold req, tear off tabs if applicable	6
4	tear off req tab and separate white and yellow req	6 input data in HBOC (SSN, pick the right pt from list, demographic, physician & insurance info, ICD9 code)	75
5	input data in HBOC (SSN, pick the right pt from list, demographic, physician & insurance info, ICD9 code)	Pick up Pen 6	17
6	pick up pen	write data on req 6	4
7	write data on req	put down pen 6	3
8	put down pen	toggle to ALG 6	1
9	toggle to ALG	Re-attasched insurance information to the original paperwork 6	14
10	input data in ALG	toggle to ALG : this step and the previous one vary from cycle to cyle.	1
11	input data in ALG	input data in ALG 6	34
12	label with red tape	remove specimen from bag, checks names against req 6	6
13	remove label from printer	remove label from printer 6	16
14	place main label on white req	label specimen	16
15	place white requisition in white req tray	put labeled specimens in out rack	1
16	label specimen	place main label on white req	5
17	put labeled specimens in out rack	place white requisition in white req tray	3

Histo Block Diagram

Takt Time 87.3 sec





PPCS Register Tubes Example

Part Production Capacity Sheet (PPCS)		Available Time (hrs/day)	Available Time (min/day)	Available Time (sec/day)	Customer Demand (units/day)	Takt Time: (seconds)	Factory Demand (units/day + scrap)	Required Cycle Time	Total Labor Time	Number of People Required	Head Count	1	2	3	4	5
Department	Register Tubes	24.0	1,440.0	86400	1,500.0	57.6	1,500.0	57.6	205.0	3.6	Cycle Time (Sec)	205.0	102.50	68.33	51.25	41.00
											Cycle Time (Min)	3.4	1.7	1.1	0.9	0.7
Input into system		***Basic Time***			***Capacity***						Output Hourly	17.6	35.1	52.7	70.2	87.8
		Manual Operation Time	Machine Processing Time	Completion Time	Capacity = Loads per Day Based on Completion Time	Max Container Batch Size	Machine Container Capacity	Max Machine Capacity per Day	Machine Cycle Time Per Piece	SWIP	# of Machines Required	Output Daily	421	843	1,264	1,686	2,107
Work Sequence	Description of Process	(sec)	(sec)	(sec)												
Cumulative Times		205	0	205												
Percent Manual Op. &		100.0%	0.0%													
1	Open up Tubes	3.0	-	3.0				-	#DIV/0!	-	#DIV/0!					
2	Tear off and separate req	81.0		81.0				-	-	-	#DIV/0!					
3	Log into system	17.0		17.0				-	-	-	#DIV/0!					
4	Write datea on req and put in system	58.0		58.0				-	#DIV/0!	-	#DIV/0!					
5	Label	46.0		46.0												
6																
7																
8																

Histo Class Exercise

	Step #	Labor Time sec	Machine Time	Max Container Size
Tissue Prep	1	60	8.47 hrs	150 pc
Embed	2	10	21	
Cutting	3	60	80	
Staining	4	10	45 min	30pc
Signout	5	105	none	

Available time = 24 hours

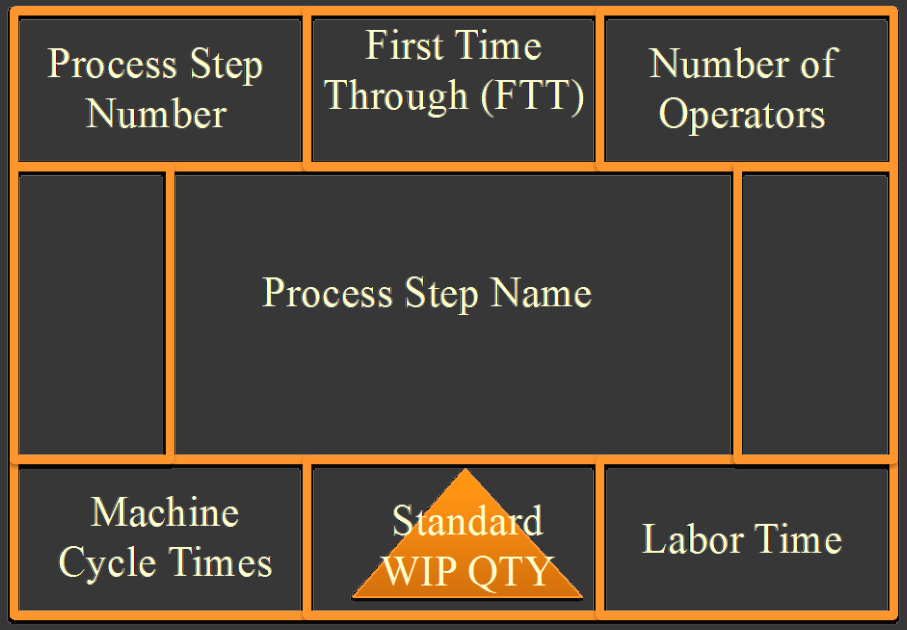
Customer Demand = 990 units /day

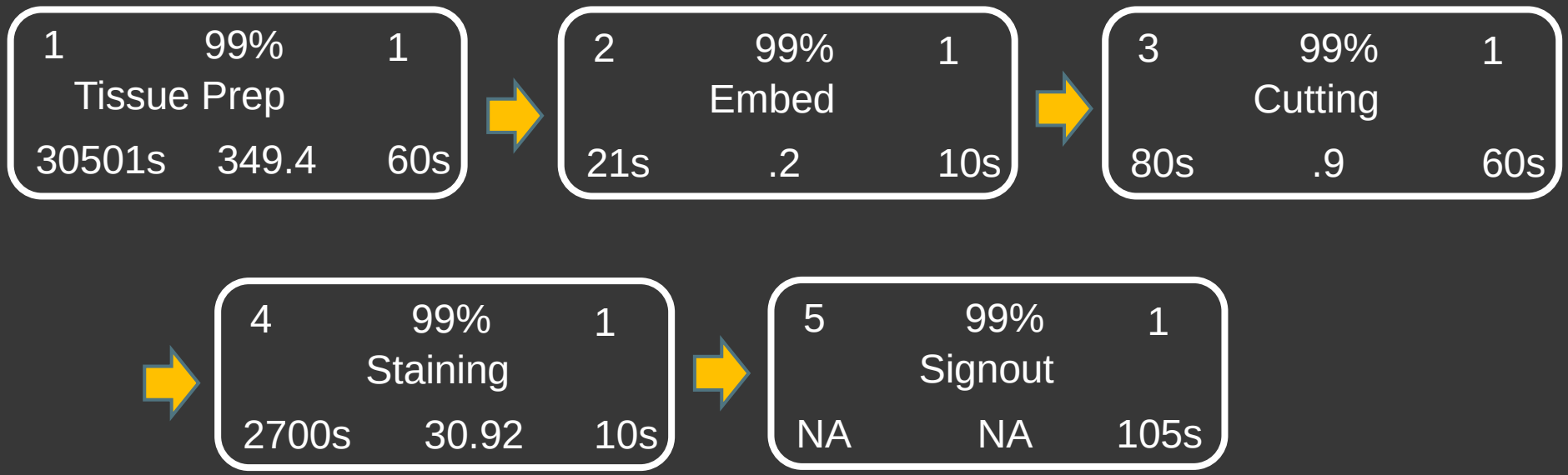
Takt Time?

Std WIP?

Histo Block Diagram

Takt Time 87.3 sec





PPCS Sheet

	Part Production Capacity Sheet (PPCS)	Available Time (hrs/day)	Available Time (min/day)	Available Time (sec/day)	Customer Demand (units/day)	Takt Time: (seconds)	Factory Demand (units/day + scrap)	Required Cycle Time	Total Labor Time	Number of People Required
Decription	Histology									
Specimen		***Basic Time***			***Capacity***					
		Manual Operation Time	Machine Processing Time	Completion Time	Loads per Day Based on Completion Time	Max Container Batch Size	Machine Container Capacity per Hour	Max Machine Capacity per Day	SWIP	# of Machines Required
Work Sequence	Description of Process	(sec)	(sec)	(sec)						
	Cumulative Times									
	Percent Manual Op. & VA Time									
1										
2										
3										
4										
5										
6										
7										
8										

Detailed Histo Steps – No Tissue Prep

PART PRODUCTION CAPACITY SHEET

Part No		Available Time (hrs/day)	Available Time Seconds / Day:	Available Time Minutes per day	Total Labor Time	Takt Time (sec):	Customer Demand (units per day)	Number of people required Takt Time	Factory Demand (Units per day)	Required Cycle Time	Number of people required Cycle Time	Head Count	1	2	3	4	5
Part Name		24.00	86400	1440	198	28800	3	0.01	3	28800	0.01	Cycle Time (Sec)	198.0	99.0	66.0	49.5	39.6
												Cycle Time (Min)	3.30	1.65	1.10	0.82	0.66
OPERATION		TIME DISTRIBUTION										Output Hourly	18.18	36.37	54.55	72.74	90.92
												Output Daily	436.42	872.83	1309.25	1745.66	2182.08
Job Step	Process Step	Labor Value Added	Labor Non Value Added	Machine Non Value Added	Machine Value Added	Complete Time	Standard Wip	Bottle Neck	Planned Downtime or changeover time								
		(sec)	(sec)	(sec)	(sec)	(sec)			Units	Sec	Time Allocated	Prod Cap (units/day)	Comments				
	Cumulative Times:	0	198	0	2700	2898											
	Percent:	0.0%	6.8%	0.0%	93.2%	100.0%	-										
1	Embed		25.4			25.43						3397.75					
2	pickup and shave		6.3			6.29						13745.45					
3	pickup pencil and write on slide		1.0			1.00						86400.00					
4	cut		38.0			38.00						2273.68					
5	tissue to slide and rack		8.0			8.00						10800.00					
6	clean off water bath		5.1			5.14						16800.00					
7	Take old block out		3.8			3.83						22539.13					
8	walk back to embedder		1.3			1.29						67200.00					
9	Load staining rack (10 slides)		2.0		2700	2702.00						31.98					
10	Cover slip		2.0			2.00						43200.00					
11	Sign out		105.0			105.00						822.86					
12																	

	Calculating cut times				Total embed cut stain		Capacity (Embedder)	1000 - 1400 blocks
	biopsies	23.0%	52.7	12.121	103		Cut	1136 per day
	5 cuts	5.0%	82.7	4.135	133		Staining	180/hour, 4320 per
	15 cuts	2.7%	232	6.264	282			3842 per day currently
	Routine	69.3%	22.7	15.7311	72.7			
		100.0%		38.2511				

Detailed Histo Steps – By Program

		Program #1	Program #2	Program #3	Program #4	Program #5	Program #6	
	Reagents	Routine	Biopsy 1	Biopsy 2	Cell Block	Dr. Ma's Brain	Fatty Tissues	Note: #6 & #8 Eliminated
		Minutes	Minutes	Minutes	Minutes	Minutes	Minutes	
1	10% Formalin	60	15	0	15	30	60	
2	10% Formalin	60	15	0	15	30	60	
3	70% Alcohol	40	20	20	15	30	60	
4	80% Alcohol	40	20	20	15	30	60	
5	95% Alcohol	45	20	20	15	60	60	
6	95% Alcohol	45	20	20	15	60	60	
7	100% Alcohol	45	20	20	15	60	60	
8	100% Alcohol	45	20	20	15	60	60	
9	Xylene	45	20	20	15	60	60	
10	Xylene	45	20	20	15	60	60	
11	Paraffin	30	15	15	15	45	30	
12	Paraffin	30	15	15	15	60	30	
13	Paraffin	30	15	15	15	60	30	
14	Paraffin	30	15	15	15	0	30	
	Prep change over	60	60	60	60	60	60	
	Total Cycle Time (min)	**650.0**	**310.0**	**280.0**	**270.0**	**705.0**	**780.0**	
	Total Cycle Time (sec)	**39,000.0**	**18,600.0**	**16,800.0**	**16,200.0**	**42,300.0**	**46,800.0**	
Tissue Tek	**Tissue TeK Capacity (Blocks per day)**	**664.6**	**1,393.5**	**1,542.9**	**1,600.0**	**612.8**	**553.8**	**6,367.6**
	Hours	**10.8**	**5.2**	**4.7**	**4.5**	**11.8**	**13.0**	
	% of Total Block Volume	**56.5%**	**12%**	**11%**	**0.5%**	**0.01%**	**20%**	**100.0%**
	Tissue Tek Time (includes hour changeover time)	39,000	18,600	16,800	16,200	42,300	46,800	29,950
used in total sheet only	**Weighted Average Tissue Tek Time**	22,035	2,232	1,848	81	4	9,360	35,560
	Number of Blocks	739.476	739.476	739.476	739.476	739.476	739.476	
used in individual PPCS sheets	**Weighted avg number of blocks**	417.80	88.74	81.34	3.70	0.07	147.90	739.55
	Number of Slides	3842.52	3842.52	3842.52	3842.52	3842.52	3842.52	2500
used in individual PPCS sh	**Weighted avg number of slides**	2171.0	461.1	422.7	19.2	0.4	768.5	2500.25

Scheduling and Demonstrated Capacity

Most scheduling today is done to what we call

Demonstrated Capacity or

Demonstrated Capability

Some companies that schedule to less than 35% of their existing standard

Scheduling Has Two Components

Capacity & Load

$$\text{Excess Capacity} = \frac{\text{capacity} - \text{load}}{\text{capacity}}$$

$$= \frac{160 \text{ hours (8 hours x 20 days x 1 shift)} - 140 \text{ hours}}{160 \text{ hours}}$$

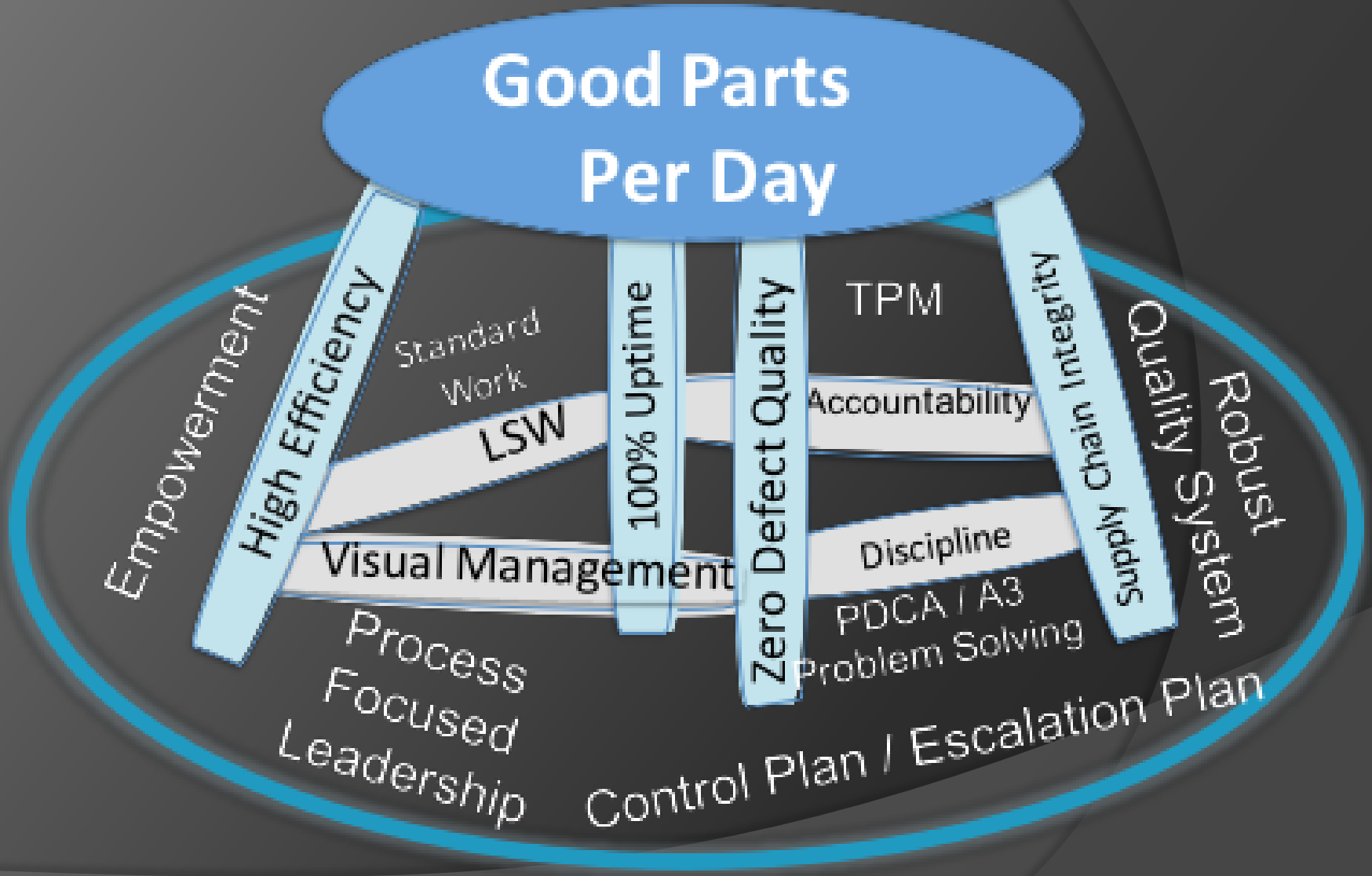
Excess capacity = 12.5%

What if Load exceeds Capacity?

Design cells to 50% capacity

LAB Shop Floor Management

4 Legged Stool



Work Around Solutions (WAS)

Rework!...

Never build it in to a line. Make it painful!

Waste Continues to Grow and Multiply

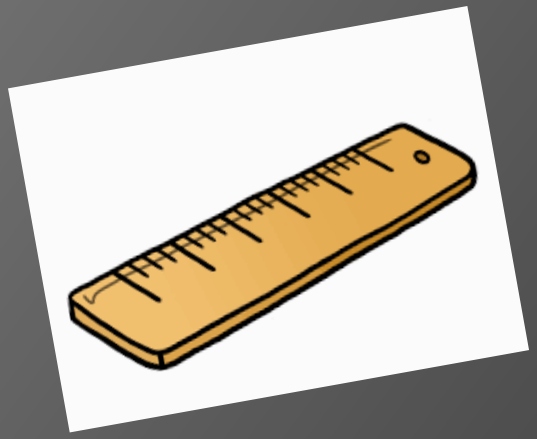
Don't manage the problem – Fix the Problem!

Root Cause Corrective Action

1. Training
2. Manual Inspection
3. Visual Controls
4. Poka Yoke

The Hidden Factory

MEASUREMENT SYSTEM ANALYSIS (MSA)



“What you measure and how you measure should evolve over time” … Anonymous

Anyone Ever Served on a Jury?

Jury MSA		Defendant	
		Innocent	Guilty
Jury	Not Guilty	✓	X ☹
	Guilty	X ☹ ☹	✓

What About Decisions on our Products?

Tester MSA		Product	
		Good	Bad
Test	Pass	✓ ☺	X ☹ ☹ ☹
	Fail	X ☹ ☹	✓ ☹

Example - Fred the Farmer

Count the number of "F's" or "f's" in the passage below for 2 Rounds.

The Necessity of Training Farm Hands for First Class Farms in the Fatherly Handling of Farm Live Stock is Foremost in the Eyes of Farm Owners. Since the Forefathers of the Farm Owners Trained in the Farm Hands for First Class Farms in the Fatherly Handling of Farm Live Stock, the Farm Owners Feel they should carry on with the Family Tradition of Training Hands of First Class Farmers in the Fatherly Handling of Farm Live Stock Because they Believe it is the Basis of Good Fundamental Farm Management for you and for them.

Repeatable? Reproducible?

Example - Fred the Farmer

Round 1 – count and record your answer (1 minute)

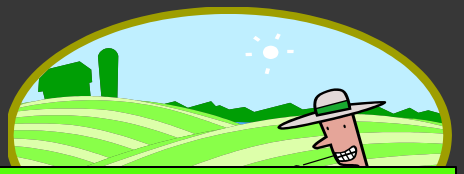
Round 1 completed

Example - Fred the Farmer

Round 2 – record your answer again (1 minute)

Round 2 completed

Example - Fred the Farmer



Fred the Farmer Solution

Goodwill MSA – June 3, 2015

MSA Opportunity		Standard	
		Good	Bad
Match Std?	Yes	120	**86**
	No	**60**	4
		180	90

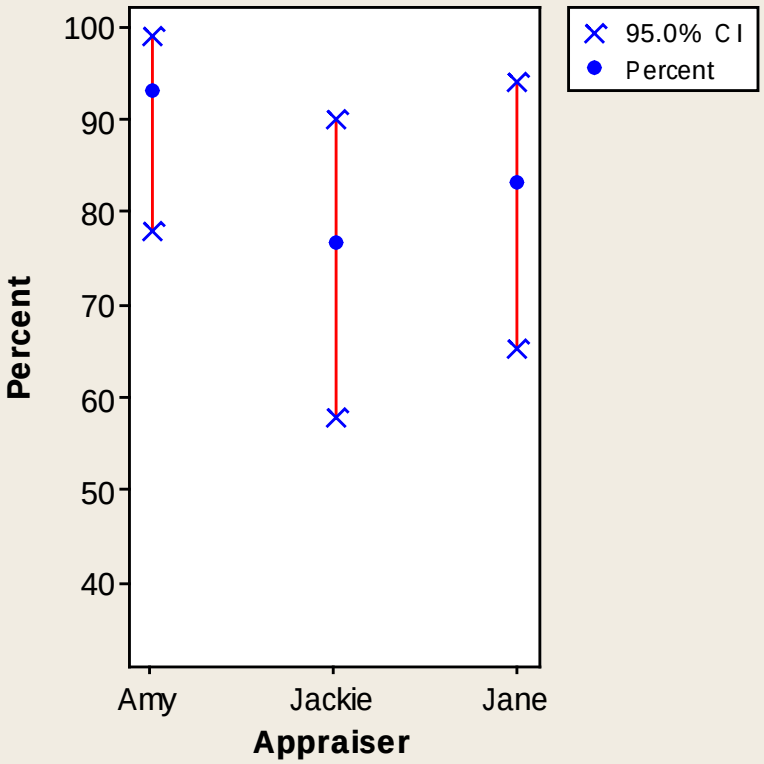
MSA Opportunity		Standard	
		Good	Bad
Match Std?	Yes	67%	96%
	No	**33%**	**4%**
		100%	100%

Goodwill MSA Results – June 2015

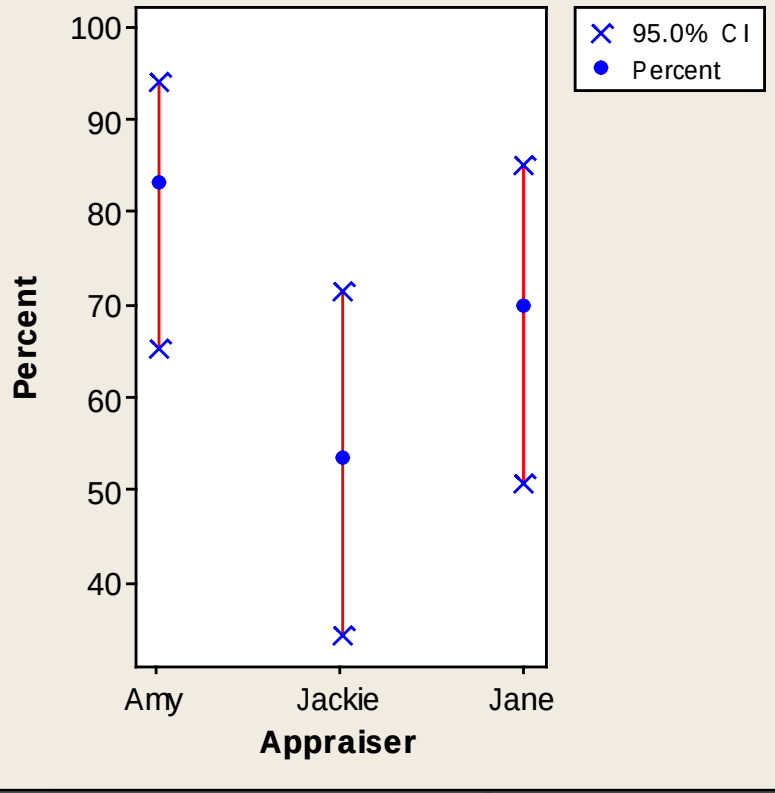
Assessment Agreement

Date of study: 6/4/2015
Reported by: A. McDermott
Name of product: Goodwill Sort
Misc:

Within Appraisers



Appraiser vs Standard



Quality Lean Tools

There are a lot of pieces...

The KEY is to build a culture that integrates all of them!

Real Life Examples

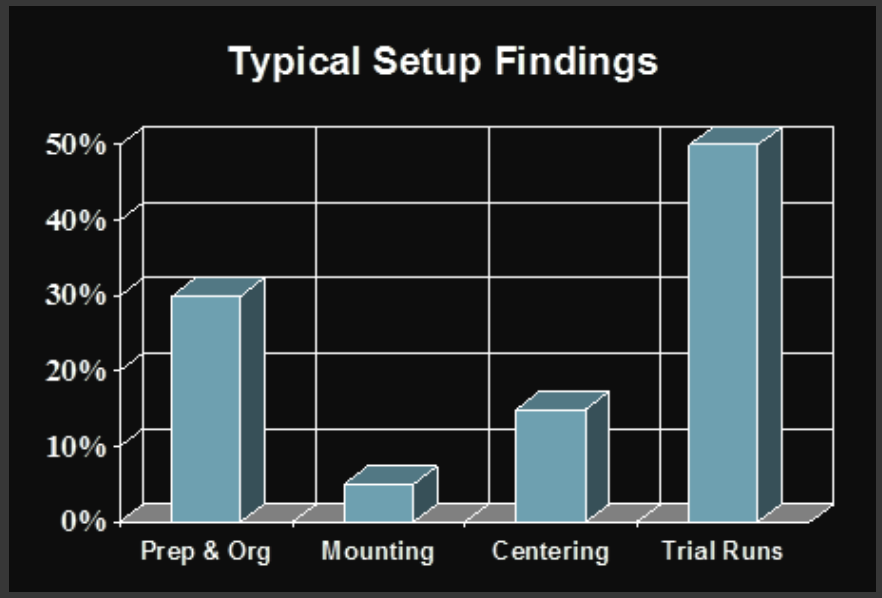
- Review Report Out 11-8-04
- Lab Examples and Videos

Analyze The Changeover or Setup

Internal vs External Time

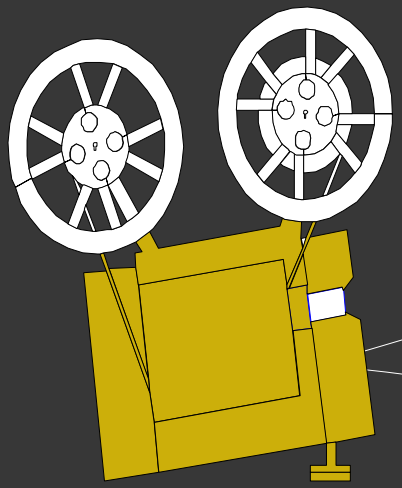
Definition of Setup Time:

The amount of time taken to change a machine from the last part of a production lot to the first good part of the next production lot.



(Clock time, not labor time)

Video



Video on Setup Reagent Change Over

Reagent Changeover Improvements

Operator Standard Work Form

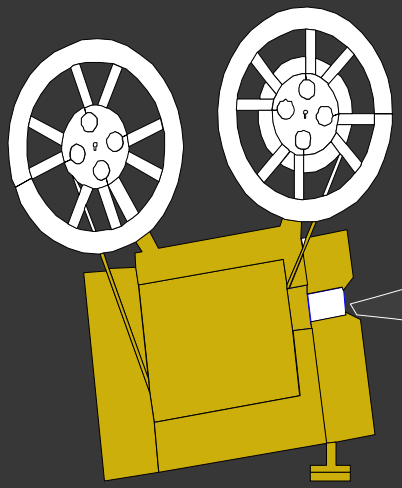
See Policy and Procedures for more detail as necessary

Rev None 11/3/04

Standard Work: Change Reagents Sysmex Comparison

Job Step #	Operation Description	Quality / Notes	Base Time	Projected Time	Actual Time	Percent Saved
1	Heard alarm signaling reagent change needed - change displayed on screen		33	33	4	
2	Open cabinet for reagent access		2	2	2	
3	Locate empty container and verify that it is low		17	17	0	
4	Walk to supply closet to retrieve reagent		7	7	7	
5	Return to machine with reagent		13	13	12	
6	Open reagent container		22	22	17	
7	Transfer tubing from old container to new container, initital, and date		29	29	16	
8	Place in position in cabinet		6	6	14	
9	Replace cap on old reagent		6	6	6	
~~10~~	~~Locate log book~~		~~2~~	~~0~~	~~0~~	
~~11~~	~~Open logbook to correct section~~		~~30~~	~~0~~	~~0~~	
12	Locate lot# on container		10	10	4	
~~13~~	~~Removing labeling materiat that obscured the manufacturing label~~		~~52~~	~~0~~	~~0~~	
~~14~~	~~Log the lot # etc. on logbook~~		~~10~~	~~0~~	~~0~~	
15	Close cabinet door		3	3	19	
~~16~~	~~Return logbook to top of machine~~		~~3~~	~~0~~		
17	Initiate reagent prime		9	9	9	
~~18~~	~~Take empty container to disposal spot~~		~~15~~	~~15~~	~~0~~	
19	Prime completed - ready for run		25	25	25	
	Total		294	197	135	54%

Video



Video on Histology Embedding Batch vs. 1pc flow

Hematology Pilot Results:

PRODUCT PROCESS FLOW DETAILED ANALYSIS Product: FLUIDS Inpt Boundary Receipt in Lab Outpt Boundary Result				
	Initial	Pilot	Reduction	% Reduction
Total Steps	125	48	77.00	62%
Orig Seconds	4327	1711	2616.00	60%
Min	72.1	28.5	43.60	60%
Hours	1.2	0.5	0.70	58%
Days	0.1	0.02	0.08	80%
Distance	633.5	50.7	582.80	92%
Value Added	32.22%	64.12%	-0.32	99%
Non-Value Added	1.62%	0.76%	0.01	53%
Storage	59.42%	9.92%	0.50	83%
Inspect	0%	0.04%	0.00	
Transport	6.75%	1.98%	0.05	71%

- Re-Laid out area and consolidated printers for the Stago and the Atlas
- Operators Loved It
- Added muffin fan to dry slides quicker

Shop Floor Management – Metrics Focus

Results Focused

Vs.

Process Focused

What behaviors does results focused drive?

10 Keys to Lean Success

1. Top-management commitment
2. Communication
3. Dedicated resources
4. Training
5. Get people involved
6. Maintain intensity – Compelling Need to Change
7. No layoffs due to Continuous Improvement
8. Share the wealth
9. Frequent review of progress
10. Track performance

Drive Lean Through the Line Organization – Support with *Dedicated Resources*

To Implement Lean Takes:

- Great courage
- Conviction
- Faith
- Unwavering commitment
- Innovation (Today's Problems Came From Yesterday's Solutions)
- Patience and Impatience
- Resources (preferably dedicated)
- Some financial investment
- Someone to walk you through it the first time
- Strong, committed senior leadership team

Imagine The Pioneers Crossing This Great Continent!

You have to provide the "Compelling Reason" to Change!

What Can I Do When I Go Back

- Make an Improvement… 1/10th of 1% is just fine!
  - Identify your Customers Value Added Proposition
  - Baseline Your Metrics (are thy the right ones?) and Take Baseline Video and Pictures
  - Figure Out Your Customer Demand and Takt Time
  - Practice the Three As
  - Process Map Every Step Your Patient or Product Takes
  - Make a List of All the “Dissatisfiers” in Your Area or Steps You can Eliminate Simplify or Combine
  - Develop a Vision For Your Area and Set Continuous Improvement Goals
  - Identify The Gaps
  - Make a Top Ten List of Improvements You Would Like to Make
  - Develop a Quick Wins List and Implement It

Pull on Any Available Lean Resources For Help But Don’t Necessarily Wait For Them

Questions?

Business Improvement Group LLC

- Contact us
  - Website (Work in Process)
    - www.biglean.com
  - Charlie Protzman
    - CharlieProtzman@biglean.com
  - Daniel Protzman – Contact me for future trainings or Lean Implementation for your facility.
    - DanProtzman@biglean.com