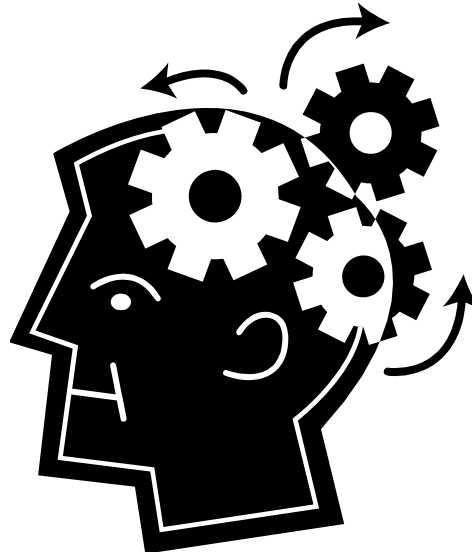


# **Problem Solving & Critical Thinking:**

## **How to Build These Vital Capabilities**

**Karen Martin**



**Webinar**

**August 2, 2012**

“  
Most people spend more time and  
energy going **around** problems  
than in trying to **solve** them.”

— *Henry Ford*

# Rule #1

## Embrace Problems



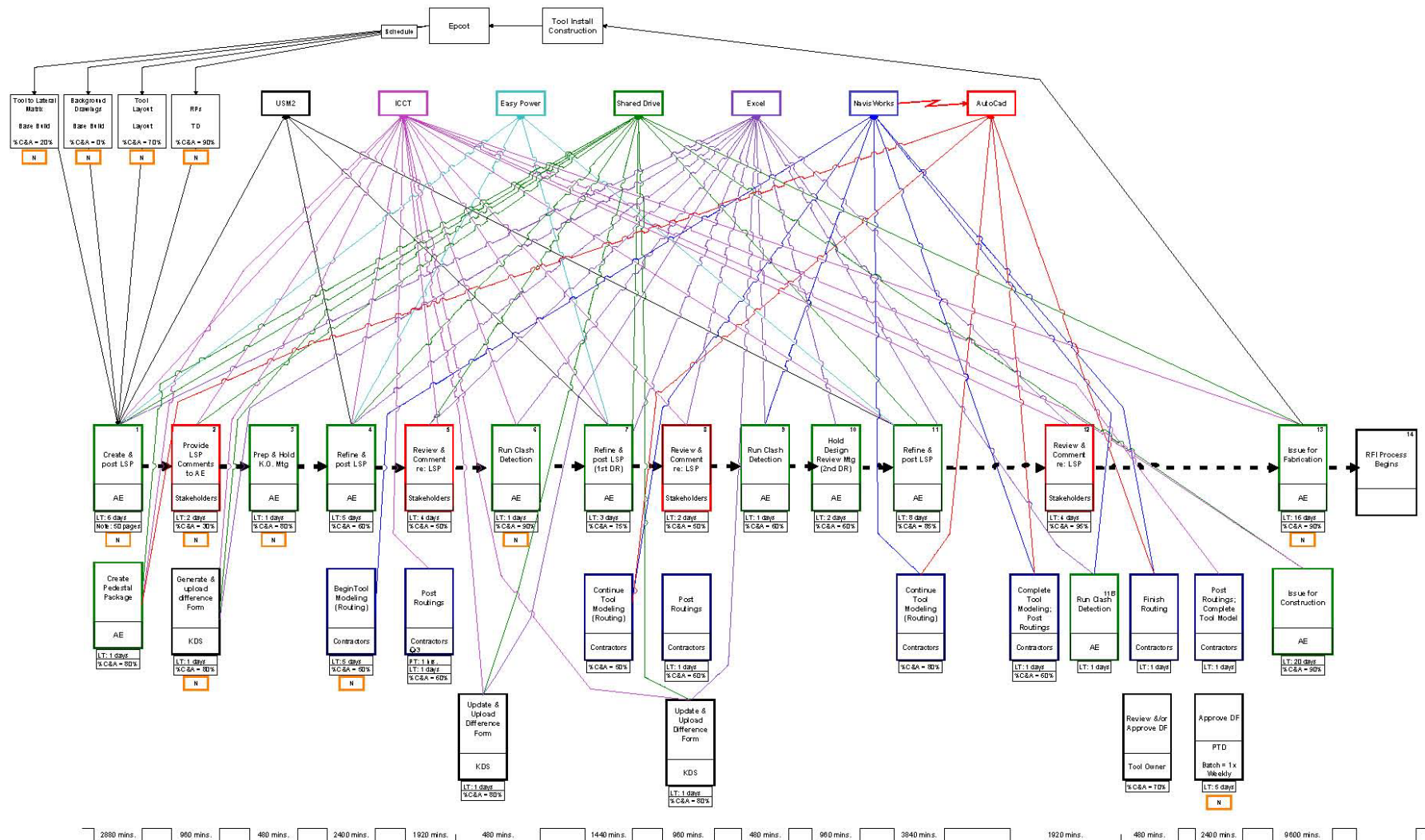
**Problems are not  
“opportunities for  
Improvement.”**

# Rule #2

## Insist on Cross-Functional Involvement

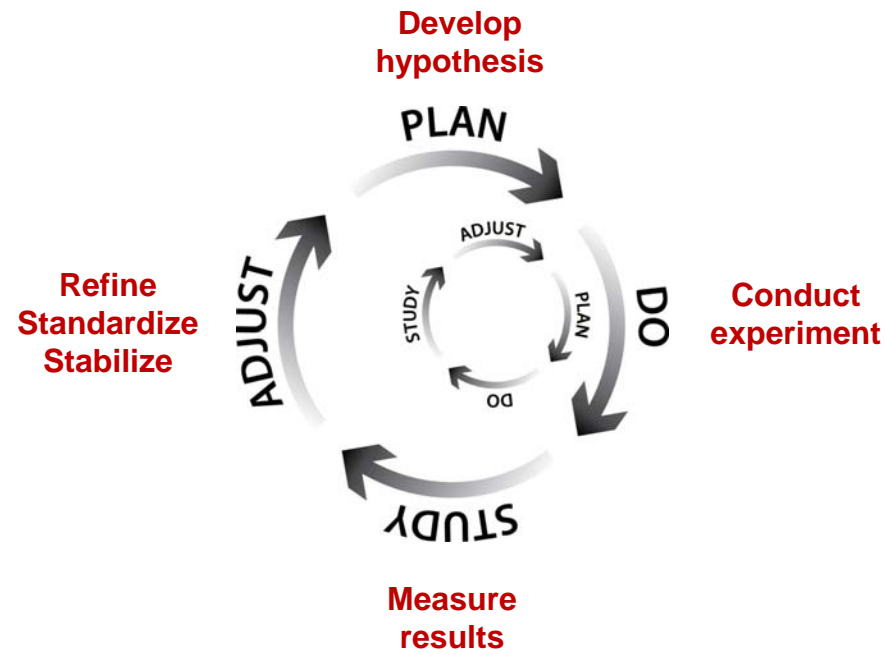


# Problems Nearly Always Extend Outside the Functional Silos in Which They're Discovered



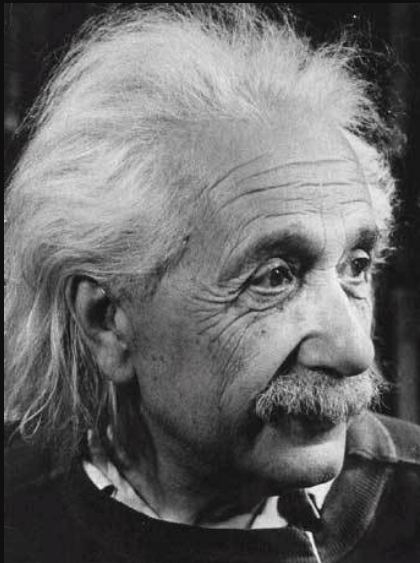
# Rule #3

## Follow PDSA Fanatically



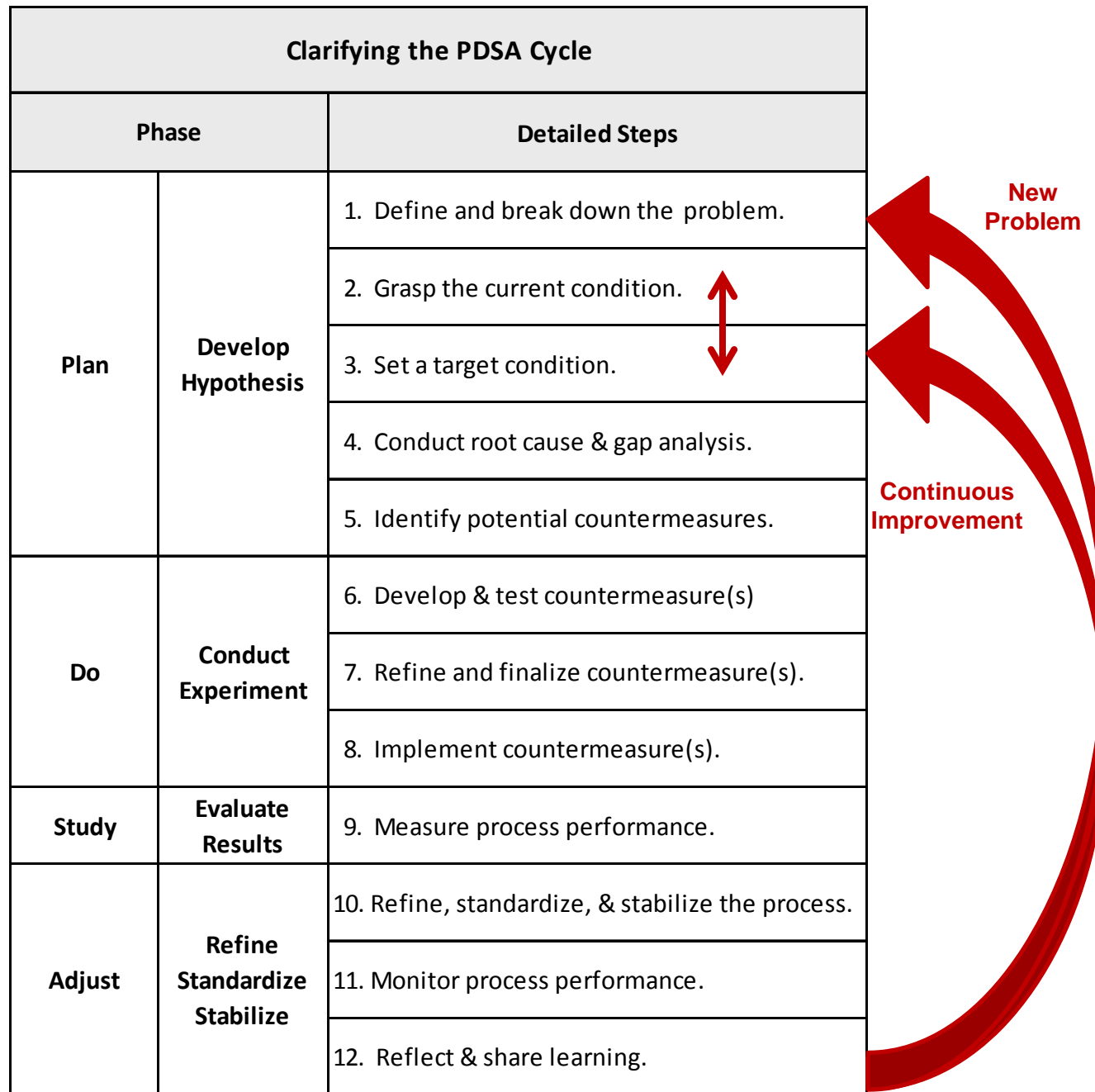
“It takes a different kind of thinking to **solve** a problem than the kind of thinking that **produced** the problem.”

— *Albert Einstein*

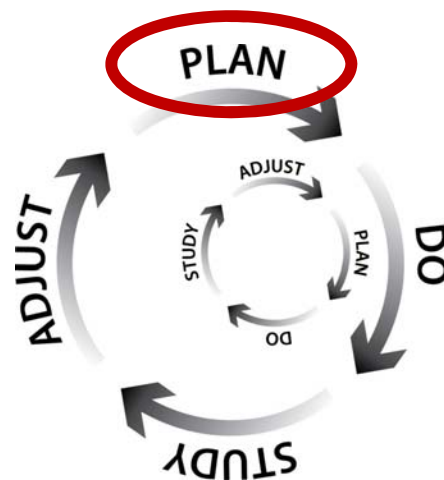




80%



Nailing the **Plan** phase of  
PDSA is the most  
important step in the  
entire problem-solving process.



**Primary Goal:  
Achieving Clarity**

# Critical Thinking

- ❖ Thinking that questions assumptions
  - Why? What if? Why not?
- ❖ Relies on set of values:
  - Clarity, precision, relevance, accuracy, fairness, sound evidence, good reasons, consistency, depth, breadth, patience, tenacity
- ❖ Leads to innovation



Lack of Clarity

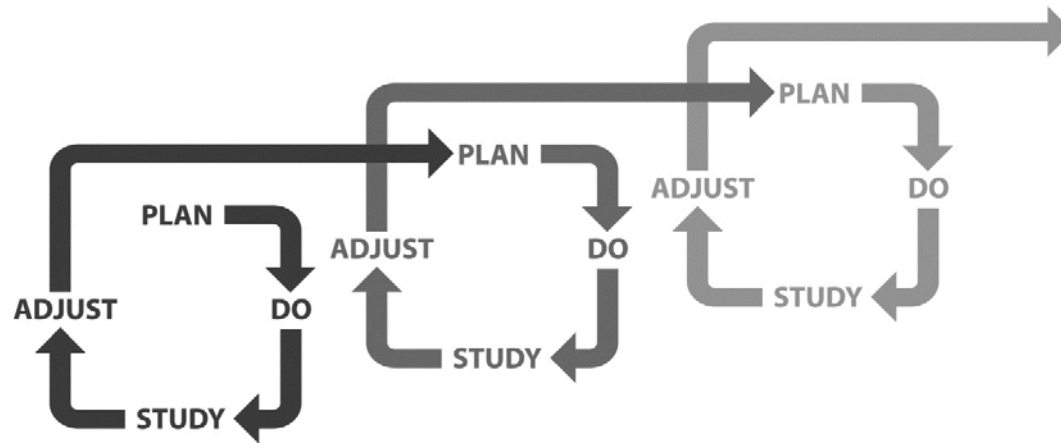
Lack of Focus

**Lack of Discipline**

Lack of Engagement

# Rule #4

Don't Look Away. Ever.

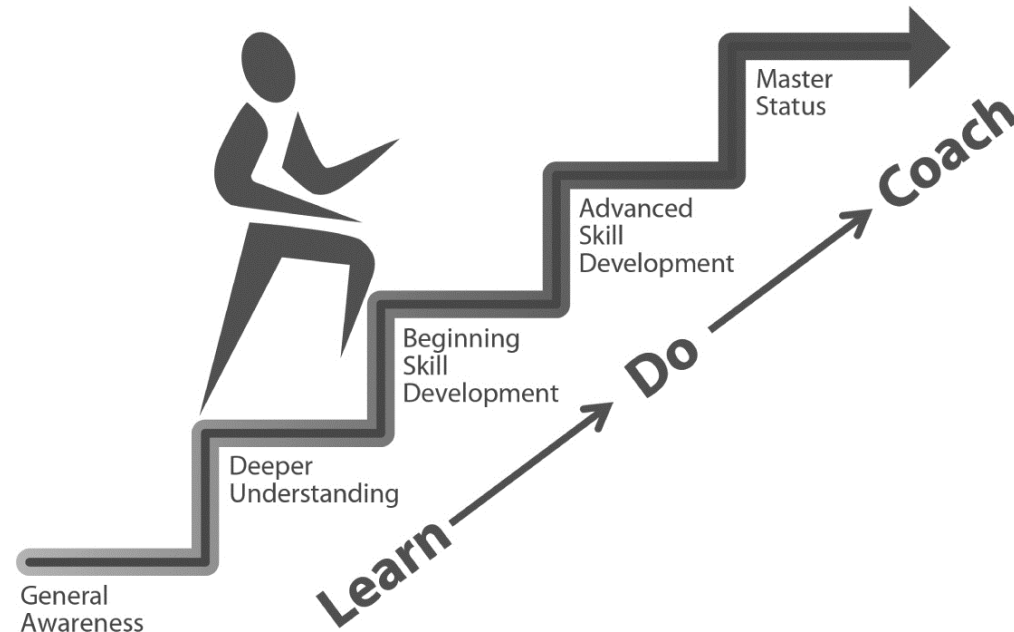


# Minding the Store

- ❖ MUST have a process owner
- ❖ 3-5 KPIs for every major process
- ❖ Frequent measurement
- ❖ Visual display of the results
- ❖ Relentless pursuit of problems and/or  
“raising the bar” (continuous improvement)

# **Developing Problem-Solving Capabilities**

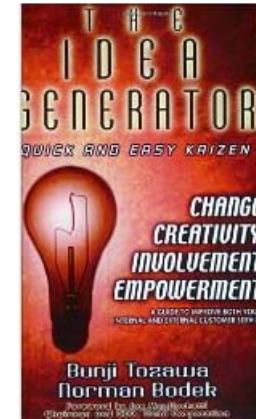
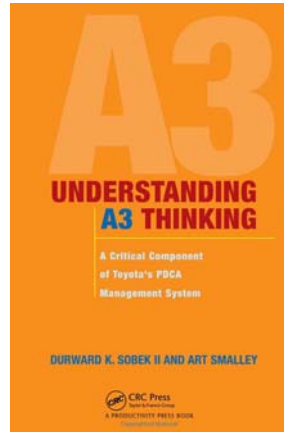
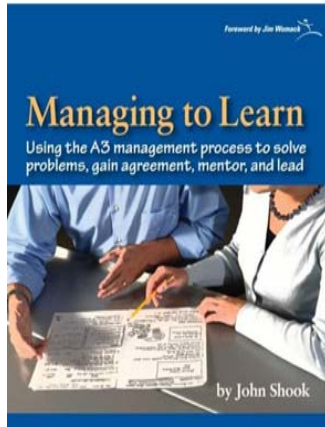
# Building mastery takes **10,000 hours** of deliberate practice



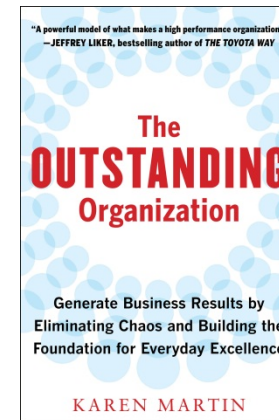
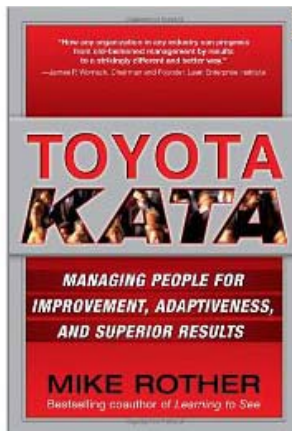


# Ways to “Deliberately Practice”

- A3 Management (Shook)
- Quick & Easy Kaizen (Bodek)

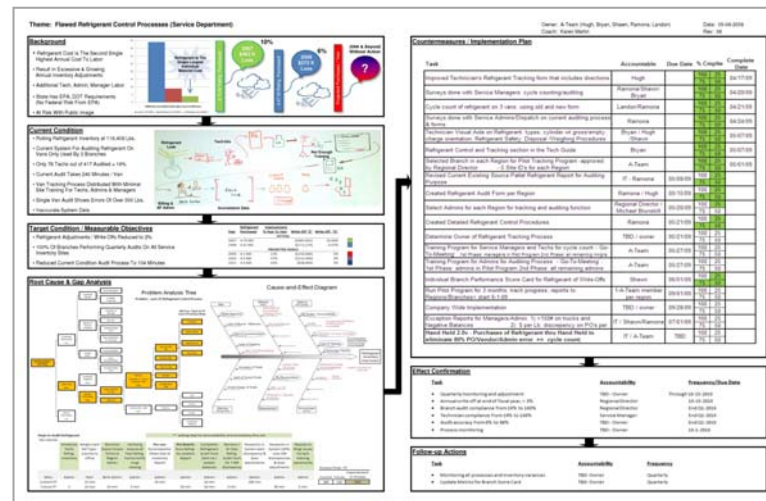


- Toyota Kata (Rother)
- Plain Old PDSA (Martin)



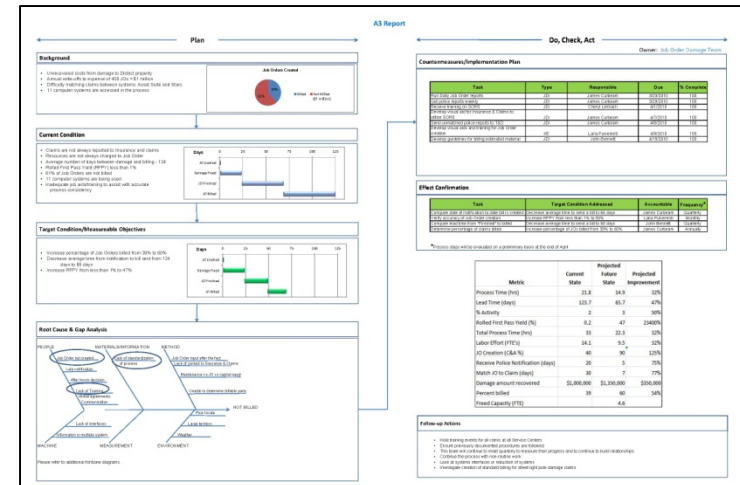
# What is A3?

- The core of Toyota's renowned *management* system.
- A structured method for applying the PDSA (plan-do-study-adjust) approach to problem-solving.
- International designation for 11 x 17" paper.



# The A3 Report

- A concise “story board” that reflects the problem solver’s discoveries & thought process along the way.
  - Limited “real estate” develops precise thinking
- A “living document” that reflects the iterative nature of problem-solving and enables organizational learning.
- Highly visual – graphics, charts, maps, drawings, etc.
- Neither the format nor the specific sections are set in stone.

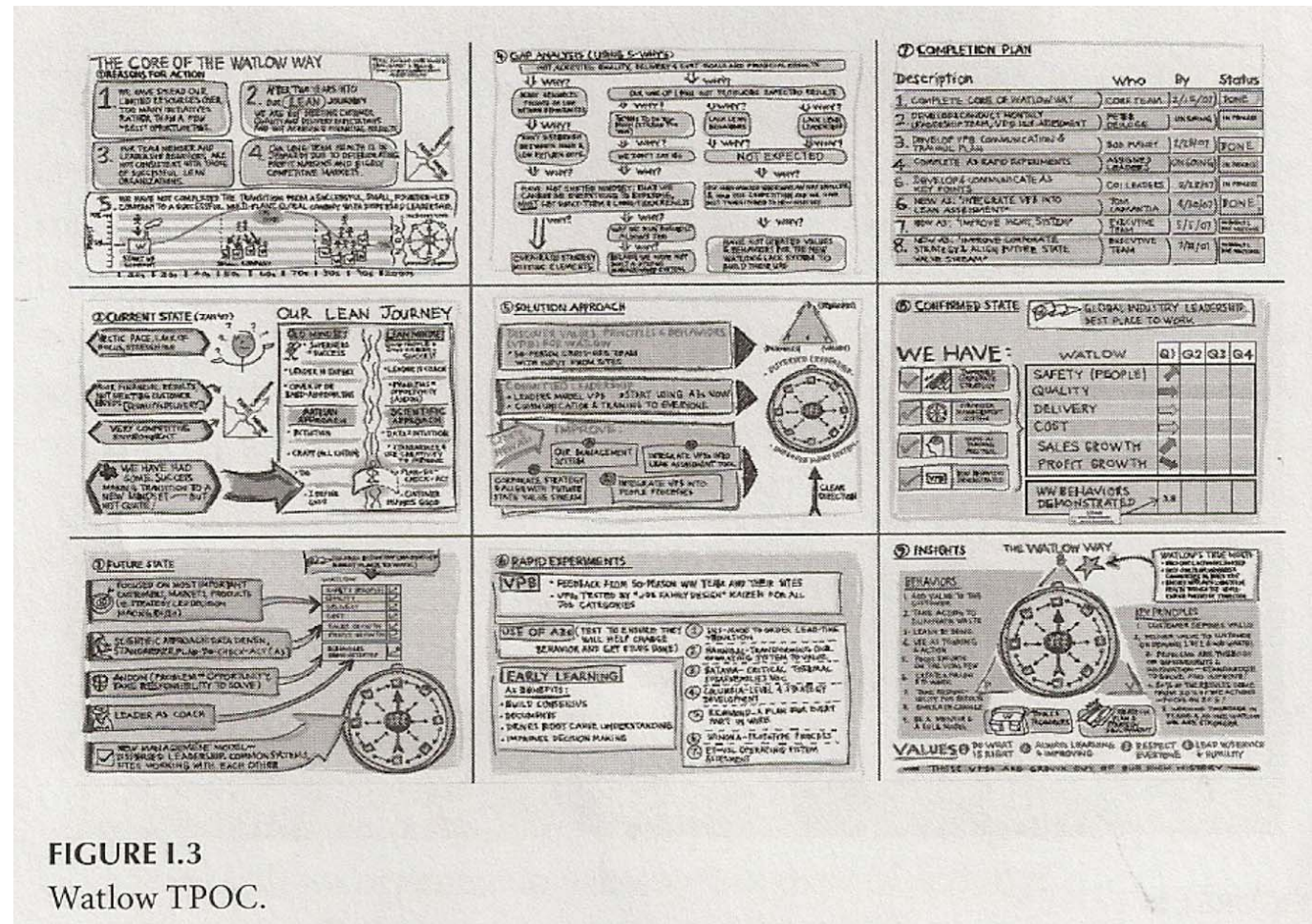




## The A3 Report is a Communication, Consensus-Building and Learning Tool

The A3 report is a story board that reflects the problem-solving process.

It is created **as** you progress through PDSA, not after.



**FIGURE 1.3**  
Watlow TPOC.

George Koenigsaecker, *Leading the Lean Enterprise Transformation.*

# Sample A3 Report

Plan

Do, Study, Adjust

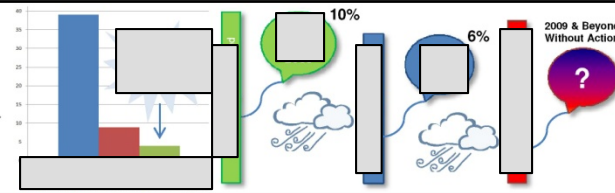
Theme: \_\_\_\_\_

Owner: A-Team ( Coach: Karen Martin

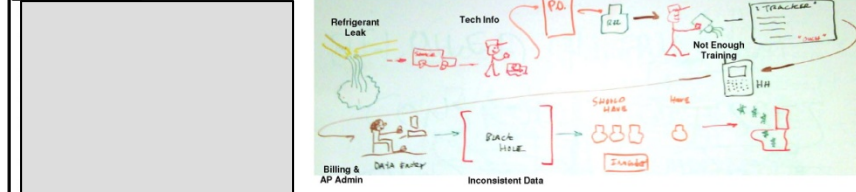
Date: 05-08-2009 Rev: 06

## Background

- Refrigerant Cost Is The Second Single Highest Annual Cost To Labor
- Result In Excessive & Growing Annual Inventory Adjustments
- Additional Tech, Admin, Manager Labor
- State Has EPA, DOT Requirements (No Federal Risk From EPA)



## Current Condition

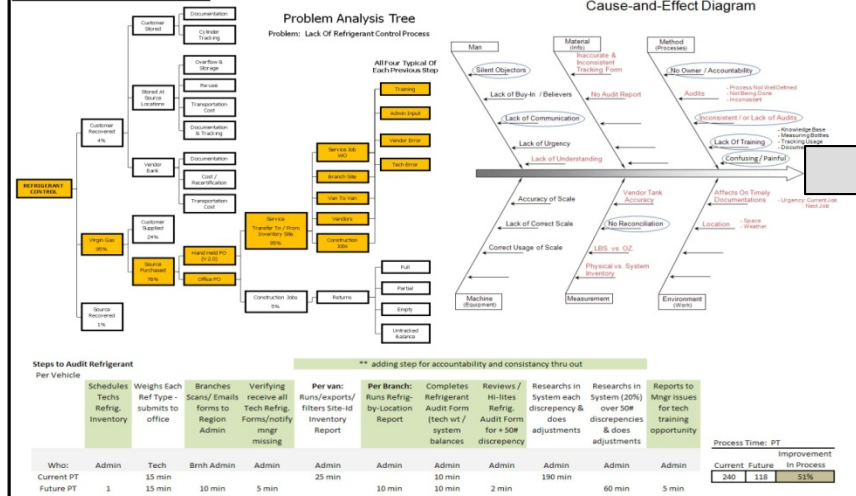


## Target Condition / Measurable Objectives

- Refrigerant Adjustments / Write Offs Reduced to 2%
- 100% Of Branches Performing Quarterly Audits On All Service Inventory Sites
- Reduced Current Condition Audit Process To 104 Minutes

Year	Refrigerant Purchased	Improvement % Year To Year ACTUAL	Write Off "S"	Write Off "N"
2007				10.00%
2008				6.07%
2009		PROJECTED 6%		5%
2010				3%
2011				2%

## Root Cause & Gap Analysis



## Countermeasures / Implementation Plan

Task	Accountable	Due Date	% Cmplte	Complete Date
Improved Technician's Refrigerant Tracking form that includes directions			100 25	04/17/09
Surveys done with Service Managers: cycle counting/auditing			75 50	
Cycle count of refrigerant on 3 vans: using old and new form			100 25	04/20/09
Surveys done with Service Admins/Dispatch on current auditing process & forms			75 50	
Technician Visual Aide on Refrigerant: types, cylinder wt gross/empty, charge orientation, Refrigerant Safety, Disposal /Weighing Procedures			100 25	04/21/09
Refrigerant Control and Tracking section in the Tech Guide			75 50	
Selected Branch in each Region for Pilot Tracking Program -approved by Regional Director			100 25	04/24/09
Revised Current Existing Source Pallet Refrigerant Report for Auditing Purpose			75 50	
Created Refrigerant Audit Form per Region			100 25	05/07/09
Select Admins for each Region for tracking and auditing function			75 50	
Created Detailed Refrigerant Control Procedures			100 25	05/07/09
Determine Owner of Refrigerant Tracking Process			75 50	
Training Program for Service Managers and Techs for cycle count - 'Go-To-Meeting' : 1st Phase: managers in Pilot Program 2nd Phase: all remaining mgrs.			100 25	05/01/09
Training Program for Admins for Auditing Process - 'Go-To-Meeting' : 1st Phase: admins in Pilot Program 2nd Phase: all remaining admins			75 50	
Individual Branch Performance Score Card for Refrigerant of Write-Offs			100 25	05/08/09
Run Pilot Program for 3 months: track progress; reports to Regions/Branches> start 6-1-09			75 50	
Company Wide Implementation			100 25	05/15/09
Exception Reports for Managers/Admin: 1) >150# on trucks and Negative Balances 2) \$ per Lb. discrepancy on PO's per Hand Held 2.0v - Purchases of Refrigerant thru Hand Held to eliminate 80% PO/Vendor/Admin error >> cycle count;			75 50	05/20/09
			100 25	05/21/09
			75 50	
			100 25	05/21/09
			75 50	
			100 25	05/27/09
			75 50	
			100 25	06/01/09
			75 50	
			100 25	09/01/09
			75 50	
			100 25	09/28/09
			75 50	
			100 25	07/01/09
			75 50	
			100 25	TBD
			75 50	

## Effect Confirmation

Task	Accountability	Frequency/Due Date
Quarterly monitoring and adjustment	TBD - Owner	Through 10-15-2010
Annual write off at end of fiscal year, > 3%	Regional Director	10-15-2010
Branch audit compliance from 10% to 100%	Regional Director	End Q1-2010
Technician compliance from 19% to 100%	Service Manager	End Q1-2010
Audit accuracy from 0% to 98%	TBD - Owner	End Q1-2010
Process monitoring	TBD - Owner	10-1-2010

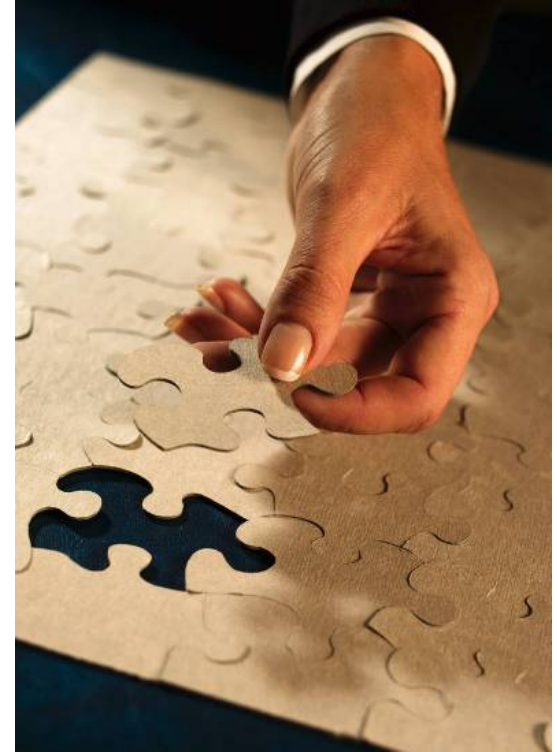
## Follow-up Actions

Task	Accountability	Frequency
Monitoring all processes and inventory variances	TBD - Owner	Quarterly
Update Metrics for Branch Score Card	TBD - Owner	Quarterly



# Benefits of the A3

- Creates **consistency** in how organizations go about solving problems, managing projects, and making decisions.
- Builds **critical thinking** and **problem-solving** capabilities across the entire organization.
- Forces a **holistic/comprehensive** view of the problem and solutions; requires collaborative problem-solving.
  - Reduction in “silo-ism”
- Thorough **root cause** analyses reduce the risk of “band-aid” solutions.



## Benefits of the A3 (continued)

- **Ownership** role drives accountability and reduces risk of “it’s everything else’s problem.”
- Stimulates **data-driven** decisions.
- Fairness and **accountability** replace blame and deceit.
- **Transparency** re: problems spawns a commitment to action.
- Develops deep organizational **capabilities**.



## A3 Roles & Responsibilities

- Problem owner
  - Individual who's accountable both for the results and the **process** for achieving results.
  - Problem owners have the **authority** to engage anyone needed and the **responsibility** to engage all relevant parties.
- Coach
  - Person teaching the owner the problem-solving process.
  - Eventually, the coach is the problem owner's direct supervisor.





# Socratic Questions to Instill Critical Thinking While Solving Problems

Question Category	Improvement-related examples
Clarification	What problem are you trying to solve? Why is that a problem? What is the target condition you aim to achieve? What behaviors are you attempting to change? What is this data telling you? Why do you say/think that?
Simplification	How could you concisely summarize all of that information without losing accuracy and meaning? How could you visually depict that data? How could you distill all that you've learned into one or two key conclusions? Which specific set of conditions will be most useful to analyze and improve initially?
Assumptions	Why do you think that countermeasure will address the problem? What do you expect will happen if/when you take that action? What do you think would happen if you tried X instead of Y? What else could explain this data? Why do you think they are resisting that idea? Why do you agree (or disagree) with that statement?
Rationale, reasons, and evidence	What data supports that conclusion? How could you collect the data you need? What is the primary root cause for that problem? How will you know if the improvement has been successful?
Viewpoints and perspectives	What about the current condition is not ideal? Which countermeasures have you considered and rejected? Why? Is there another way to look at these results? Why is that necessary?

Implications and consequences	What are the pros and cons of that countermeasure? If you did that, what do you think would happen? How could this data be used to gain consensus around your idea?
Procedure	What obstacles are preventing you from achieving the target condition? What's your next step? How could you counter their resistance? How are you going to implement this improvement? How is the new way of operating being documented? Which key performance indicators have you selected and why? Who's going to monitor this process on an ongoing basis? Who owns this process? Where else can your learning be applied in the organization? Are there similar problems elsewhere?

Appendix, *The Outstanding Organization*, Karen Martin, July 2012



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