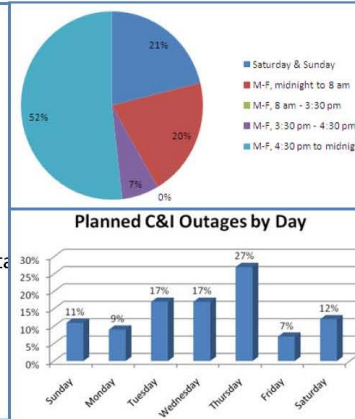


Theme: OPPD initiated Planned Outage Notification Process for small to mid-size C&I customers

Problem Statement: Performing planned C&I outages after-hours adds additional cost

Background:

- Corporate directive to reduce OT by 25% across OPPD
- Assumption that all customers prefer work done afterhours for OPPD driven outages
- Approximately \$250,000 in Customer Convenience Overtime per year
- High amount of rest time
- \$1265 per outage (based on \$50/hr of OT)
 - 19 hours of OT per outage; 3.5 meals per outage
 - 3.9 hours of rest time per outage ; 2.2 hours of double time per outage
- Customers & Employees currently happy 😊
- Customers may not understand there is a cost associated with afterhours outages ☹️

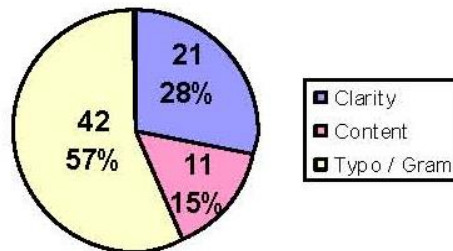


A3 Management

Lean Enterprise Program

UCSD Extension

Error Type

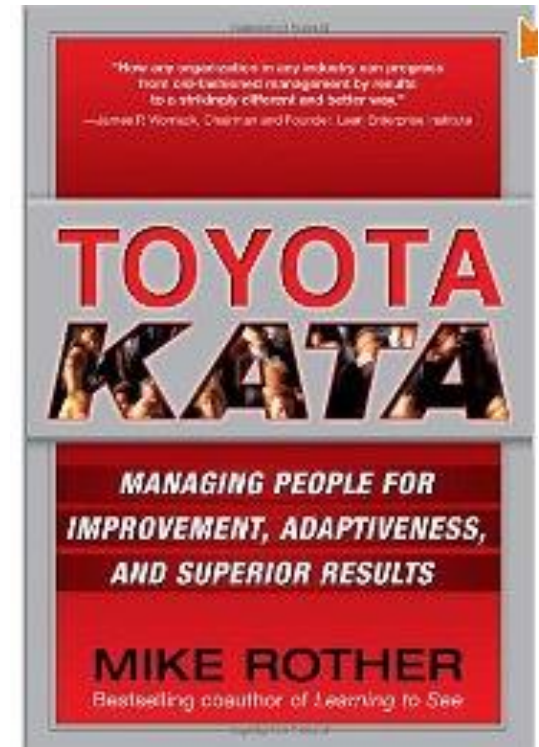
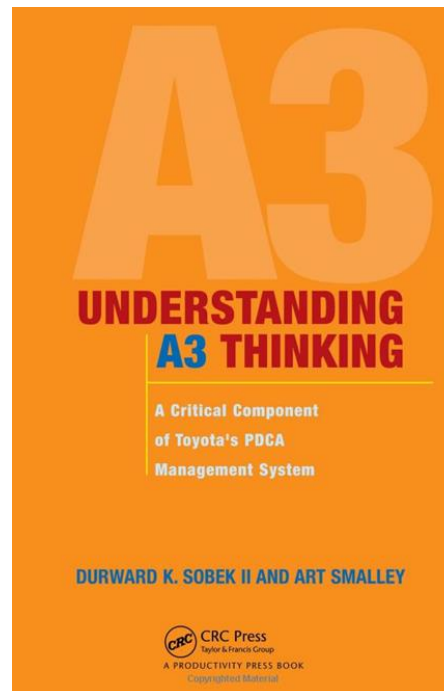
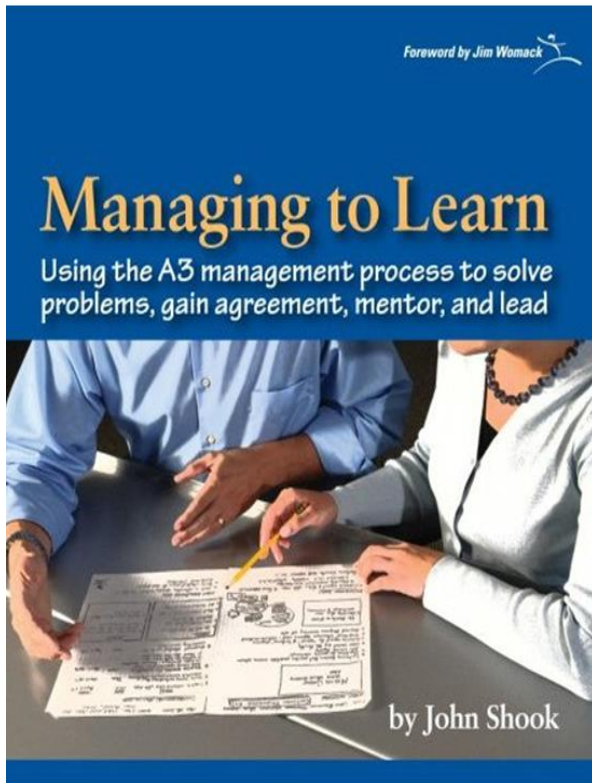


Instructor: Karen Martin

Learning Objectives

- You will learn:
 - The fundamentals of A3 problem-solving.
 - The A3 Report – purpose & common components.
 - Key root cause analysis tools.
 - Common problem-solving pitfalls.
 - How the A3 process shifts culture & develops the workforce.
 - Where the A3 fits into the Lean toolbox.

For Further Study

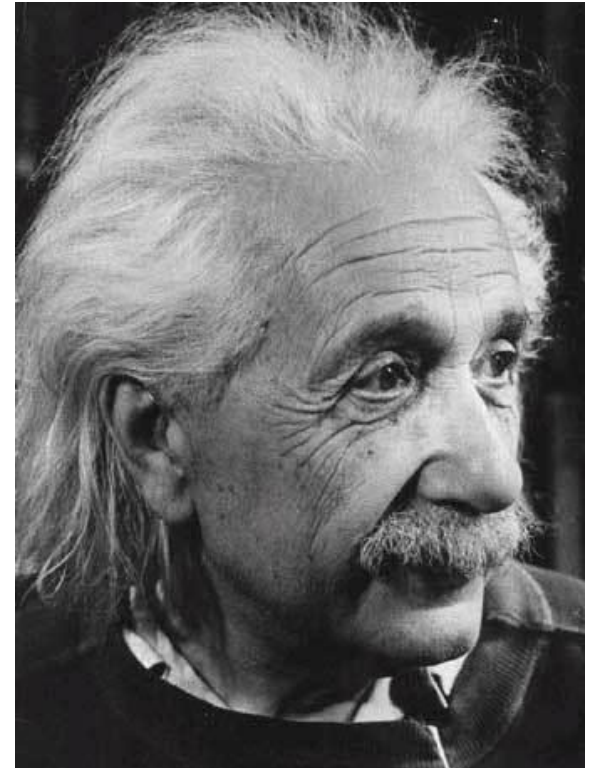




Why is problem-solving so challenging?

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

-- Albert Einstein





What is A3?

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

Plan

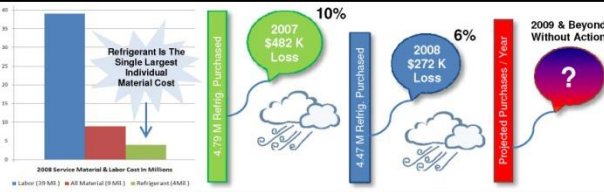
← Do, Check, Act →

Date: 05-08-2009
Rev: 06

The graphic is divided into three main sections:

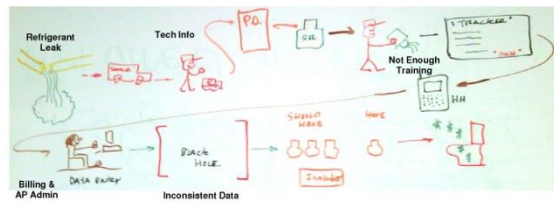
- Bar Chart (Left):** Titled "Refrigerant Is The Single Largest Individual Material Cost". The y-axis represents millions of dollars, ranging from 0 to 30. The x-axis lists three categories: "2008 Service Material & Labor Cost (\$ MIL.)", "2008 All Material (\$ MIL.)", and "2008 Refrigerant (\$ MIL.)". The bars show that refrigerant is the most expensive individual material cost.
- Bar Chart (Middle):** Titled "4.79 M Refrig. Purchased". The y-axis represents millions of dollars, ranging from 0 to 10. The x-axis lists two categories: "2007 \$482 K Loss" and "2008 \$272 K Loss". The bars show that the loss in 2007 was significantly higher than in 2008.
- Bubble Chart (Right):** Titled "2009 & Beyond Without Action". The y-axis represents projected purchases per year, ranging from 0 to 10. The x-axis lists two categories: "2007 \$482 K Loss" and "2008 \$272 K Loss". The bubbles show that the projected loss in 2007 was significantly higher than in 2008.

- 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)
- At Risk With Public Image



The diagram illustrates the data flow and information gaps in a smart meter deployment. It shows a sequence of steps: Refrigerant Leak, Tech Info, PD, Bill, Not Enough Training, 1-TRACER, Data Entry, Back Hole, Support Users, Usage, and Usage. The flowchart also includes labels for Billing & AP Admin and Inconsistent Data.

- Rolling Refrigerant Inventory at 119,408 Lbs.
- Current System For Auditing Refrigerant On Vans Only Used By 3 Branches
- Only 78 Techs out of 417 Audited = 19%
- Current Audit Takes 240 Minutes / Van
- Van Tracking Process Distributed With Minimal Site Training For Techs, Admins & Managers
- Single Van Audit Shows Errors Of Over 300 Lbs.
- Inaccurate System Data



- 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	Write Off "\$"	Write Off "%"
ACTUAL				
2007	4.79 Mil.		(\$481,965)	10.06%
2008	4.47 Mil.		(\$271,574)	6.07%
PROJECTED GOALS				
2009	4.2 Mil.	23%	(\$210,000)	5%
2010	4.4 Mil.	37%	(\$132,000)	3%
2011	4.9 Mil.	26%	(\$98,000)	2%

Problem Analysis Tree
Problem: Lack of Refrigerant Control Process

Cause-and-Effect Diagram

Steps to Audit Refrigerant Per Vehicle

Who:	Admin	Tech	Brnh Admin	Admin	Admin	Admin	Admin	Admin	Admin	Admin
Current PT	1	15 min	10 min	5 min	25 min	10 min	10 min	2 min	150 min	60 min
Future PT										5 min

Process Time: PT

Current	Future	Improvement In Process
340	118	93%

Task	Accountable	Due Date	% Cmplte	Complete Date
Improved Technician's Refrigerant Tracking form that includes directions	Hugh		100 25 75 50	04/17/09
Surveys done with Service Managers: cycle counting/auditing	Ramona/Shawn/ Bryan		100 25 75 50	04/20/09
Cycle count of refrigerant on 3 vans: using old and new form	Landon/Ramona		100 25 75 50	04/21/09
Surveys done with Service Admins/Dispatch on current auditing process & forms	Ramona		100 25 75 50	04/24/09
Technician Visual Aide on Refrigerant: types; cylinder wt gross/empty; charge orientation; Refrigerant Safety; Disposal /Weighing Procedures	Bryan / Hugh /Shawn		100 25 75 50	05/07/09
Refrigerant Control and Tracking section in the Tech Guide	Bryan		100 25 75 50	05/07/09
Selected Branch in each Region for Pilot Tracking Program -approved by Regional Director - 5 Site ID's for each Region	A-Team		100 25 75 50	05/01/09
Revised Current Existing Source Pallet Refrigerant Report for Auditing Purpose	IT - Ramona	05/08/09	100 25 75 50	
Created Refrigerant Audit Form per Region	Ramona / Hugh	05/15/09	100 25 75 50	
Select Admins for each Region for tracking and auditing function	Regional Director /	05/20/09	100 25 75 50	
Created Detailed Refrigerant Control Procedures	Ramona	05/21/09	100 25 75 50	
Determine Owner of Refrigerant Tracking Process	TBD / owner	05/21/09	100 25 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 mngrs.	A-Team	05/27/09	100 25 75 50	
Training Program for Admins for Auditing Process - "Go-To-Meeting" : 1st Phase: admins in Pilot Program 2nd Phase: all remaining admins	A-Team	05/27/09	100 25 75 50	
Individual Branch Performance Score Card for Refrigerant of Write-Offs	Shawn	06/01/09	100 25 75 50	
Run Pilot Program for 3 months; track progress; reports to Regions/Branches> start 6-1-09	1-A-Team member per region	09/01/09	100 25 75 50	
Company Wide Implementation	TBD / owner	09/28/09	100 25 75 50	
Exception Reports for Managers/Admin: 1) >150# on trucks and Negative Balances 2) \$ per Lb. discrepancy on PO's per	IT / Shawn/Ramona	07/01/09	100 25 75 50	
Hand Held 2.0v - Purchases of Refrigerant thru Hand Held to eliminate 80% PO/Vendor/Admin error >> cycle count:	IT / A-Team	TBD	100 25 75 50	

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

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



The A3 Report

- A concise “story board” that reflects the problem solver’s discoveries and thought process along the way.
- A “living document” that reflects the iterative nature of problem-solving and enables organizational learning.
- Highly visual – graphics, charts, maps, drawings, etc.
- “Making it pretty” isn’t the goal.
 - Hand drawn A3s are honored at Toyota.
- Neither the format nor the specific sections are set in stone.
 - Beware of using “templates.”
 - Serve the iterative nature of the problem-solving process.



Benefits of the A3

- Creates consistency in how the organization goes about solving problems.
- 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.
- Ownership role reduces risk of “it’s everything else’s problem.”

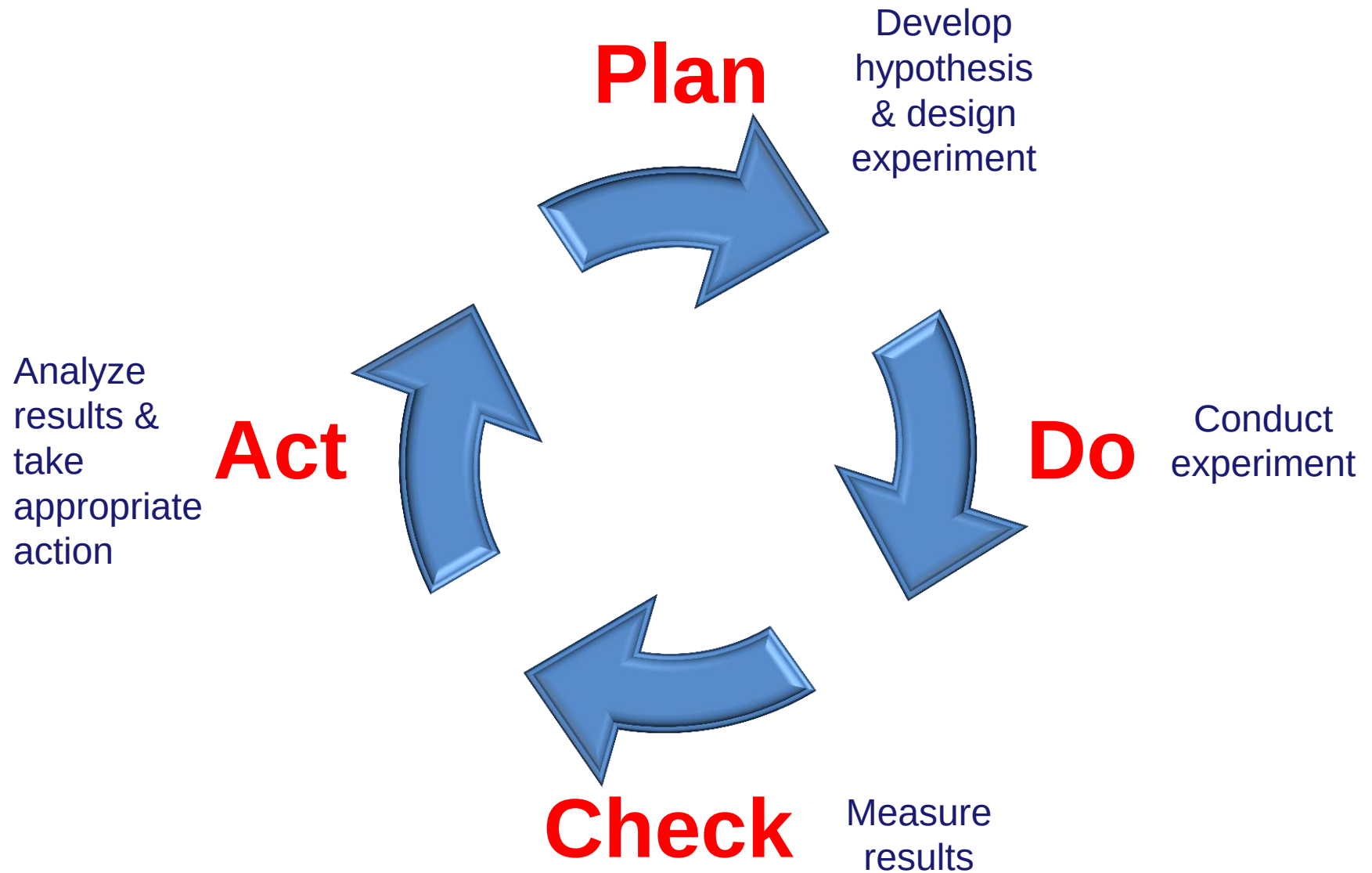


Benefits of the A3 (continued)

- Stimulates data-driven decisions.
- Fairness and accountability replace blame and deceit.
- Transparency re: problems spawns a commitment to action.
- Develops deep organizational capabilities.

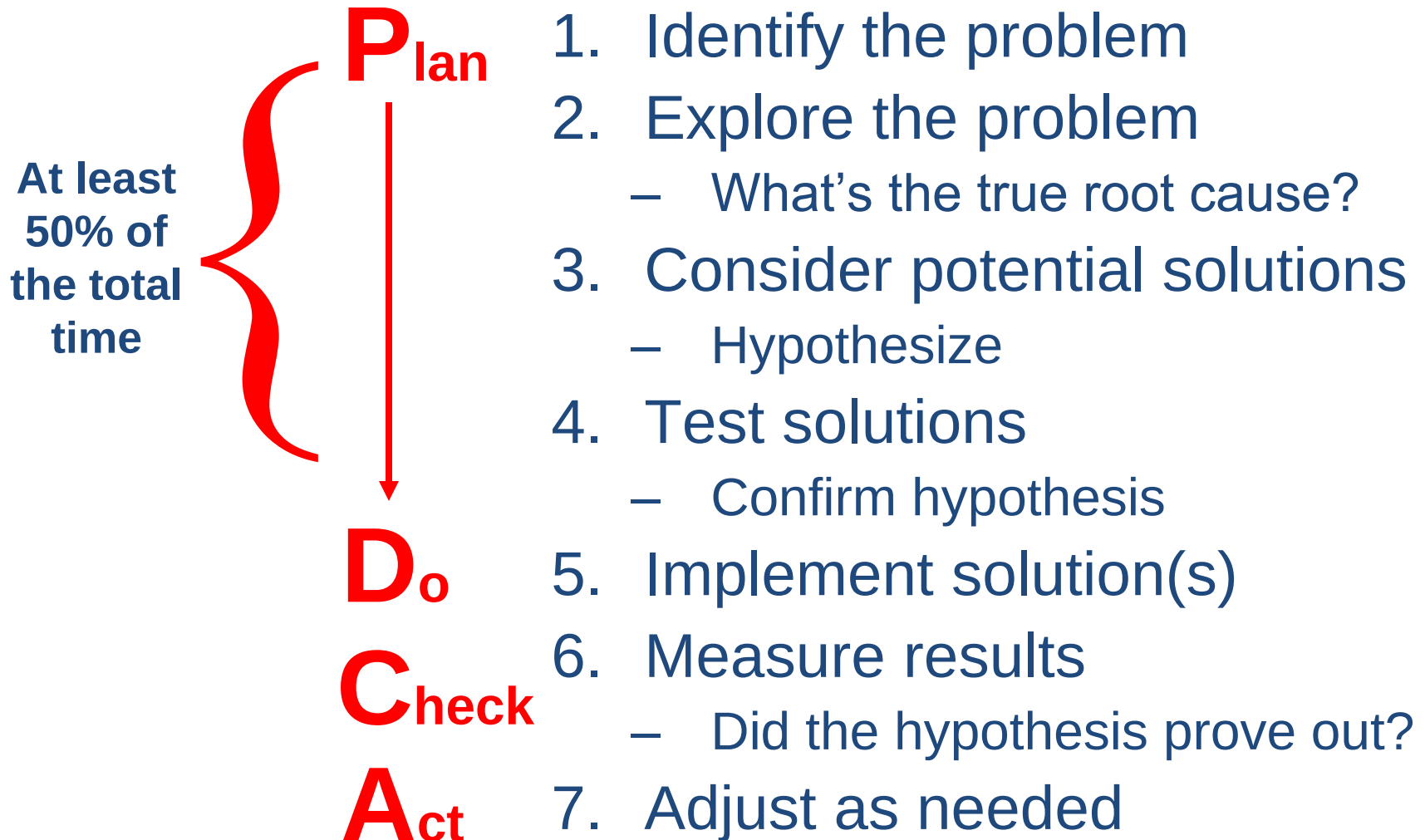


Deming's PDCA Cycle





Problem-Solving Steps



Common Components of the A3 Report

Plan

Do, Check, Act

Theme: _____

Owner: _____

Background

Countermeasures / Implementation Plan

Current Condition

Effect Confirmation

Target Condition / Measurable Objectives

Root Cause & Gap Analysis

Follow-up Actions



Common Components of the A3 Report

← Plan →

← Do, Check, Act →

Theme: _____

Owner: _____

Background

Current Condition

Target Condition / Measurable Objectives

Root Cause & Gap Analysis

Countermeasures / Implementation Plan

Effect Confirmation

Follow-up Actions





The A3 Process: Define the Theme

- What is our area of focus?
- Articulating the right theme will force you to focus on the right problem.
- Should be closely aligned with organizational goals to avoid spending limited time and resources on trivial issues.
- Avoid judging or offering solutions.
- Discussion: Sample A3s

Common Components of the A3 Report

← Plan →

← Do, Check, Act →

Theme: _____

Background

Current Condition

Target Condition / Measurable Objectives

Root Cause & Gap Analysis

Owner: _____

Countermeasures / Implementation Plan

Effect Confirmation

Follow-up Actions





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.
 - Typically the owner's direct supervisor.

Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem? (visual)

Current Condition

- Diagram of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)

Target Condition / Measurable Objectives

- Diagram of desired state
- Measurable targets – how will we know that the improvement has been successful?

Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
- When?
- Where? (if relevant)

Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?

Follow-up Actions

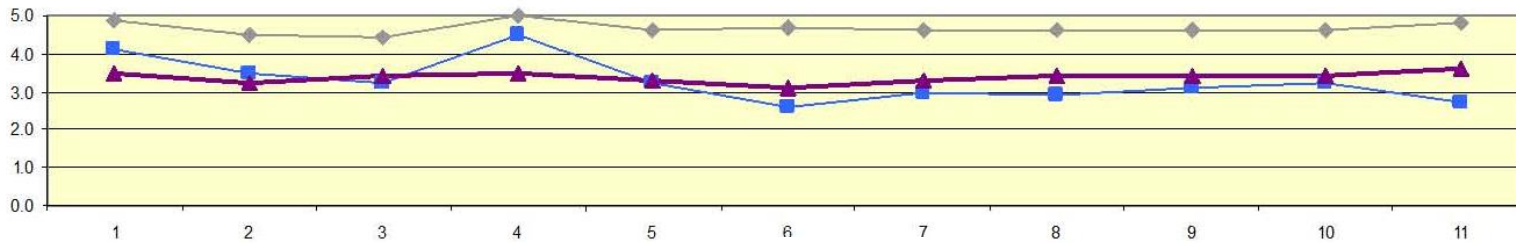
- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?



The A3 Process: Background

- Include a problem statement
 - State the problem; **do not offer a solution**
- Background – information for understanding the importance and extent of the problem.
 - How does the problem relate to company goals?
 - How was the problem discovered? How long has it been a problem?
 - **What evidence demonstrates that there's a problem?**
 - What degree of variation exists currently compared to a previous state?
- Tailor information for the audience.
- Present information **visually**.
- “Sell” the need for improvement; create a sense of urgency.

Background Sections



Gray – highest industry quality scores

Purple – average industry quality scores (benchmark)

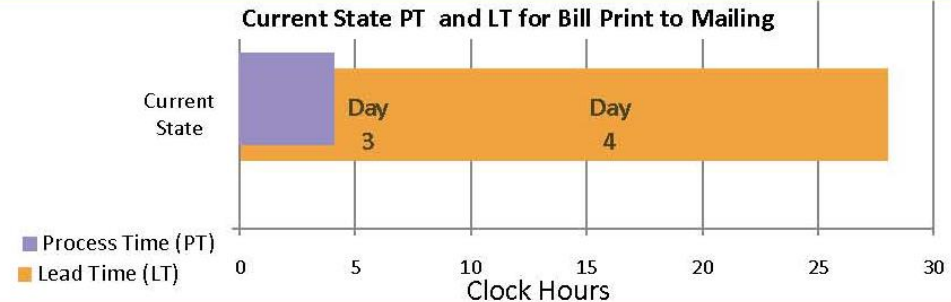
Blue – client quality scores

Background Sections

Theme: Customer Billing & Distribution

Background

- Process and lead time allowances from bill print-to-bill mailing are excessive
- Takes up to 1 ½ days for bill print-to-post office mailing
- Paper bills require too much handling time

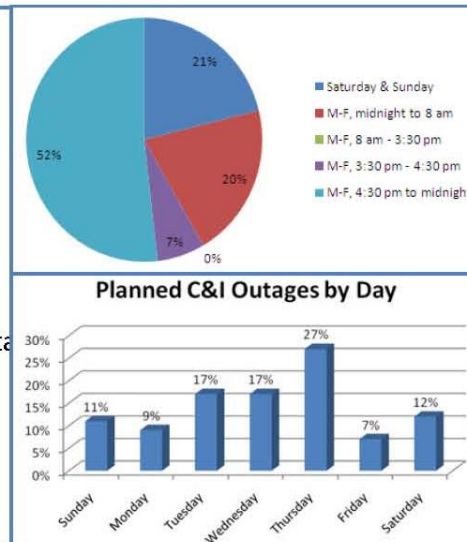


Theme: initiated Planned Outage Notification Process for small to mid-size C&I customers

Problem Statement: Performing planned C&I outages after-hours adds additional cost

Background:

- Corporate directive to reduce OT by 25% across
- Assumption that all customers prefer work done afterhours for driven outages
- Approximately \$250,000 in Customer Convenience Overtime per year
- High amount of rest time
- \$1265 per outage (based on \$50/hr of OT)
 - 19 hours of OT per outage; 3.5 meals per outage
 - 3.9 hours of rest time per outage; 2.2 hours of double time per outage
- Customers & Employees currently happy 😊
- Customers may not understand there is a cost associated with afterhours outages ☹️



Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem?



Current Condition

- **Diagram** of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)



Target Condition / Measurable Objectives

- Diagram of desired state
- Measurable targets – how will we know that the improvement has been successful?



Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
- When?
- Where? (if relevant)



Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?



Follow-up Actions

- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?





The A3 Process: Current Condition

- Two primary goals
 - Provide the audience with an overview of the current process.
 - Demonstrate a fact-based understanding of the problem.
- Content
 - Provide a visual overview of the current state process or system (strong use of charts, maps, graphs, tables, photos, etc.).
 - Highlight key factors in the current state.
 - Provide evidence of the problem (data)
 - Avoid qualitative opinions.
 - **Avoid suggesting solutions or judging.**



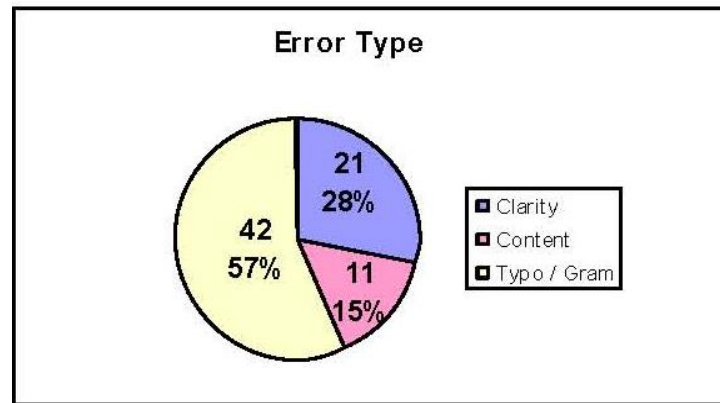
Current State Documentation Options

- Go to the gemba! – OBSERVE
- Performance data
- Spaghetti diagrams
- Documentation / job aid review
- Videotape / photos
- Worker interviews
- Work samples
- Mapping
 - Value Stream Maps (VSM) - strategic
 - Metrics-Based Process Mapping (MBPM) – tactical

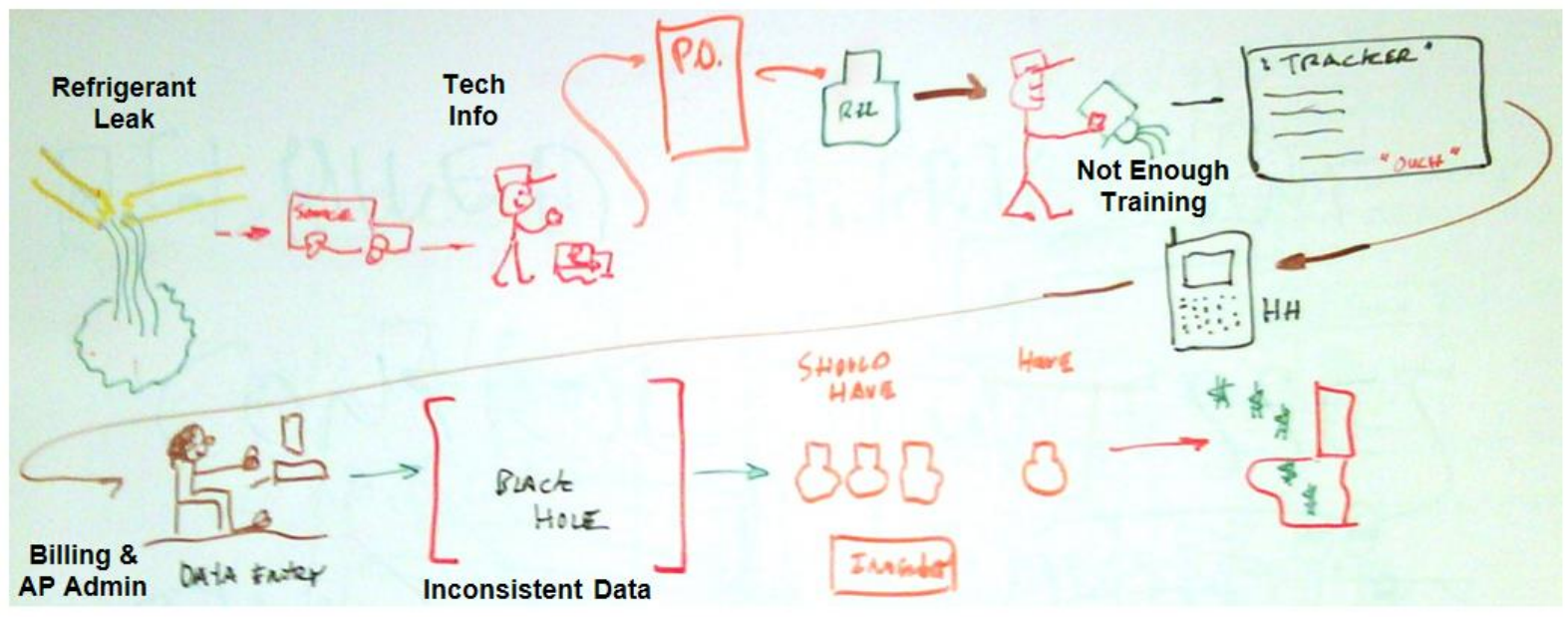


Sample A3s – Current State

Poor
correspondence
quality



Missing
inventory
resulting in
write-offs



Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem?



Current Condition

- Diagram of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)



Target Condition / Measurable Objectives

- **Diagram** of desired state
- Measurable targets – how will we know that the improvement has been successful?



Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
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- Where? (if relevant)



Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?



Follow-up Actions

- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?





The A3 Report: Targets / Measurable Objectives

- Purpose
 - How will we know that the improvement has been successful?
 - What standard or basis of comparison will be used?
- Pointers
 - Use measurable objectives when possible.
 - Consider how data will be collected and shared to evaluate the effectiveness of the implemented solution(s).

I.T.R. Process

Projected Summary Metrics

Customer Request to Close-Out

Metric	Current State	Projected Future State	Project % Improvement
Timeline Lead Time	36 Days	16.5 Days	54%
Timeline Process Time	5.75 Hrs	4 Hrs	30%
% Activity	2%	3%	52%
Rolled First Pass Yield	21%	69%	229%
Total Process Time	14.75 Hrs	5 Hrs	66%
Labor Requirements	2.0 FTEs	1.7 FTEs	15%
Freed Capacity *	-	.23 FTEs	-

* Freed Capacity when rolled out to all Software I.T.Rs ≈ 6 FTEs



Sample A3

Target Condition / Measurable Objectives

- Refrigerant Adjustments / Write Offs Reduced To X%

<u>Year</u>	<u>Refrigerant Purchased</u>	<u>Improvement % Year To Year</u>	<u>Write Off "\$"</u>	<u>Write Off "%"</u>
ACTUAL				
2007	Mil.			
2008	Mil.			
PROJECTED GOALS				
2009	Mil.	23%		
2010	Mil.	37%		
2011	Mil.	26%		



- 100% Of Branches Performing Quarterly Audits On All Service Inventory Sites.
- Reduce Audit Process from monthly at 226 minutes to quarterly at 104 Minutes.

Cost of Audits		
Site per year		
Today		Tomorrow
226 min / Site	Audit Time	104 min / Site
X 12	Audit's per year	X 4
2712 min	Minutes	416 min
45.2 hr	Hours	6.93 hr
X \$22.00	Admin Cost	X \$22.00
\$994	Approx. Audit Cost / Site	\$153

Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem?



Current Condition

- Diagram of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)



Target Condition / Measurable Objectives

- Diagram of desired state
- Measurable targets – how will we know that the improvement has been successful?



Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
- When?
- Where? (if relevant)



Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?



Follow-up Actions

- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?



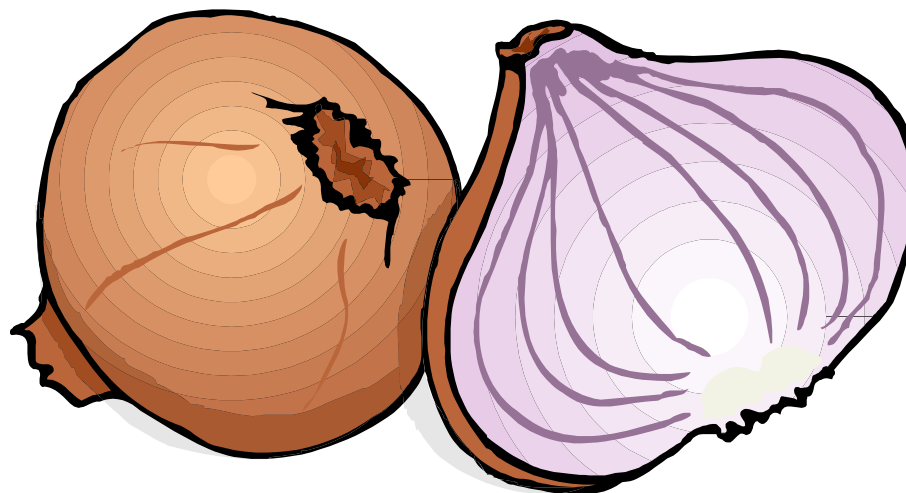


The A3 Report: Root Cause Analysis

- Show the root cause of the problem(s) identified in the current state.
- Separate symptoms and opinions from cause-and-effect determination.
- Consider which techniques will be most useful in gaining root cause insight.
- Identify add'l tests, if needed, to establish level of certainty re: cause and effect.
- Summarize your findings visually.



Root Cause Analysis





Root Cause Analysis (RCA)

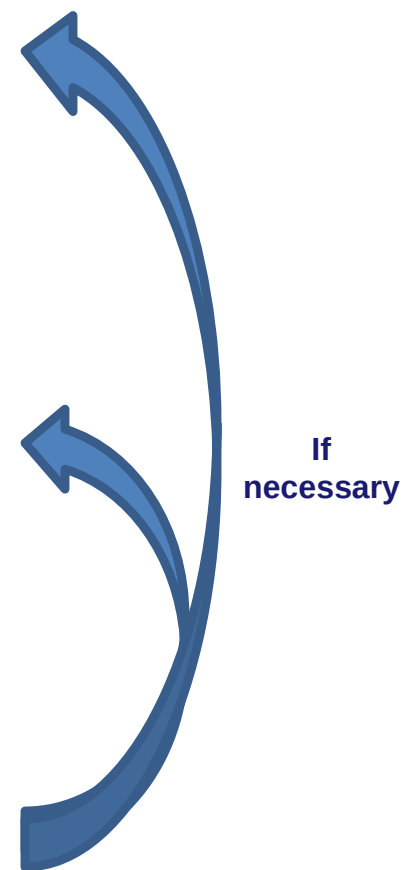
- RCA is necessary to:
 - Avoid jumping to conclusions.
 - Avoid creating “band-aid” fixes (addressing only the symptoms).
 - Select proper countermeasures.
 - Design and implement lasting solutions that truly eliminate the problem.





Root Cause Analysis Tools

- Simple problems
 - Five Why's
 - Problem Analysis Tree
- More complex problems
 - Brainstorm causes (fishbone)
 - Tally frequency of most likely causes (check sheet)
 - Identify relevant few (Pareto analysis) for countermeasure development



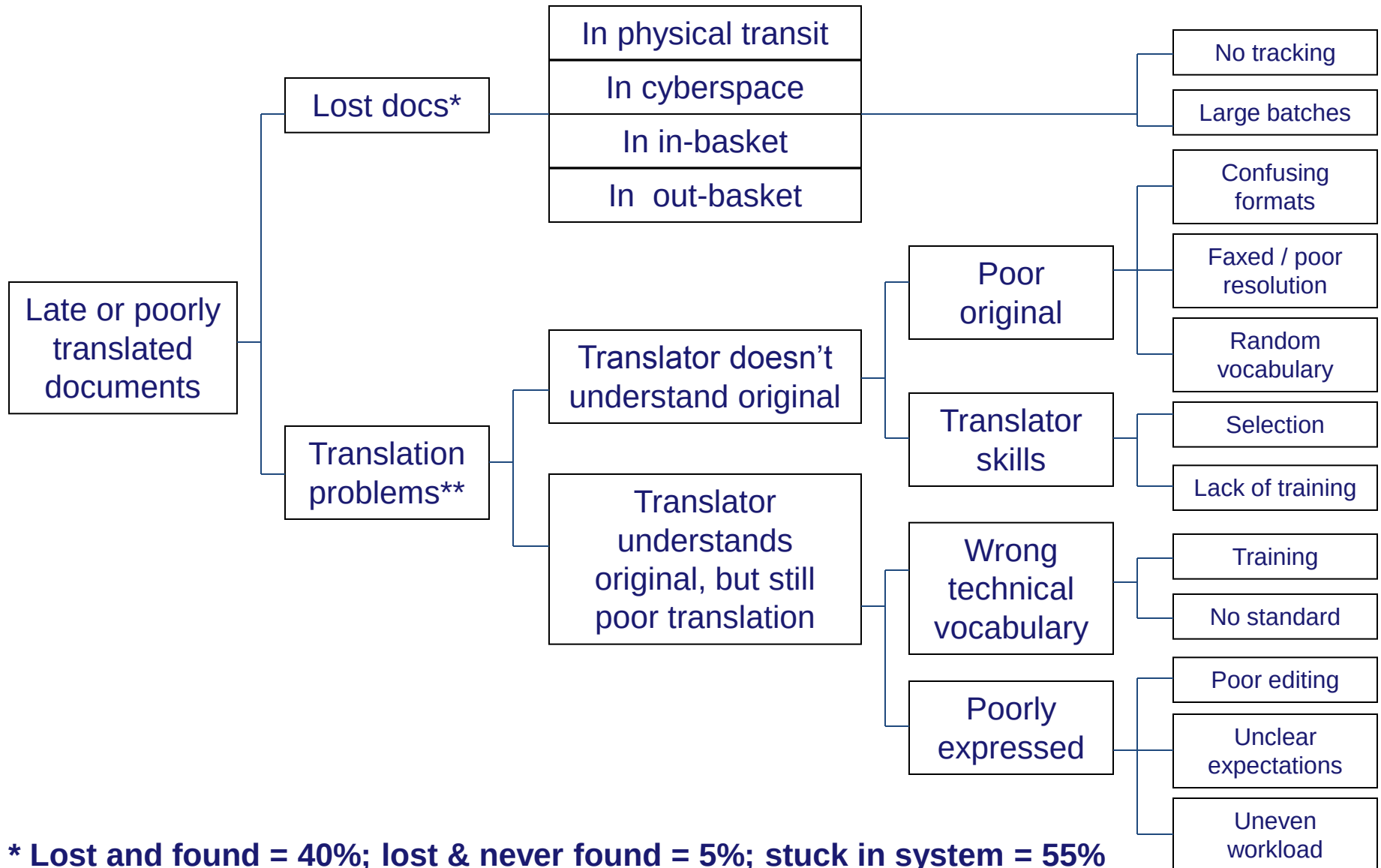
Five Why's Example

**Problem: Report is taking too much of an employee's time;
team questions whether the report is needed**

1. Why is the error report being prepared?
 - My supervisor told me to.
2. Supervisor – Why are you asking for this report?
 - One of the standard reports to be prepared per my predecessor – I have yet to determine its usage.
3. Predecessor – Why did you initiate this report?
 - Report was required in the past because personnel in order entry were making data input errors.
4. Data entry – Why were orders being input with errors?
 - Orders received via fax were blurry and hard to read.
5. Data entry - Why were the fax orders hard to read?
 - Fax machine was old and of low quality. It was replaced 10 months ago and errors no longer are occurring.

Problem Analysis Tree

Problem: Documents are not being translated well and on time



*** Lost and found = 40%; lost & never found = 5%; stuck in system = 55%**

**** Rework on over 50% of documents**



Cause-and-Effect Diagram

(aka Fishbone, Ishikawa)

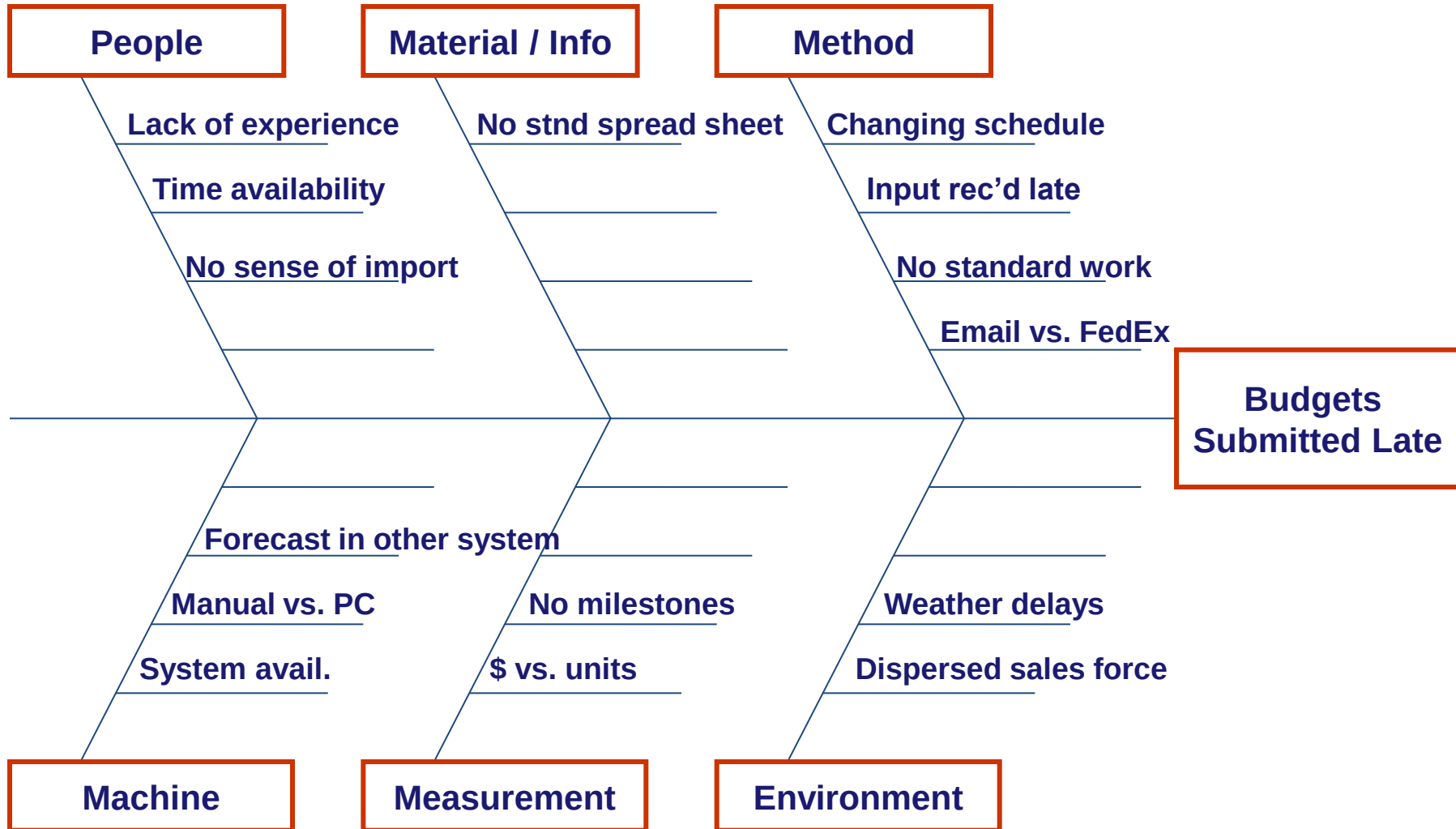
- Brainstorming tool used to identify most likely causes for an undesirable effect
- Explores potential causes in 6 categories (6 M's):
 - People (“Man”)
 - Material/Information - Inputs used in the process
 - Method - Procedures, work instructions, processes
 - Machine - Equipment, computers, tools, supplies
 - Measurement - Techniques used for assessing the quality/quantity of work, including inspection
 - Environment (“Mother Nature”) - External & internal
- Use other categories if appropriate

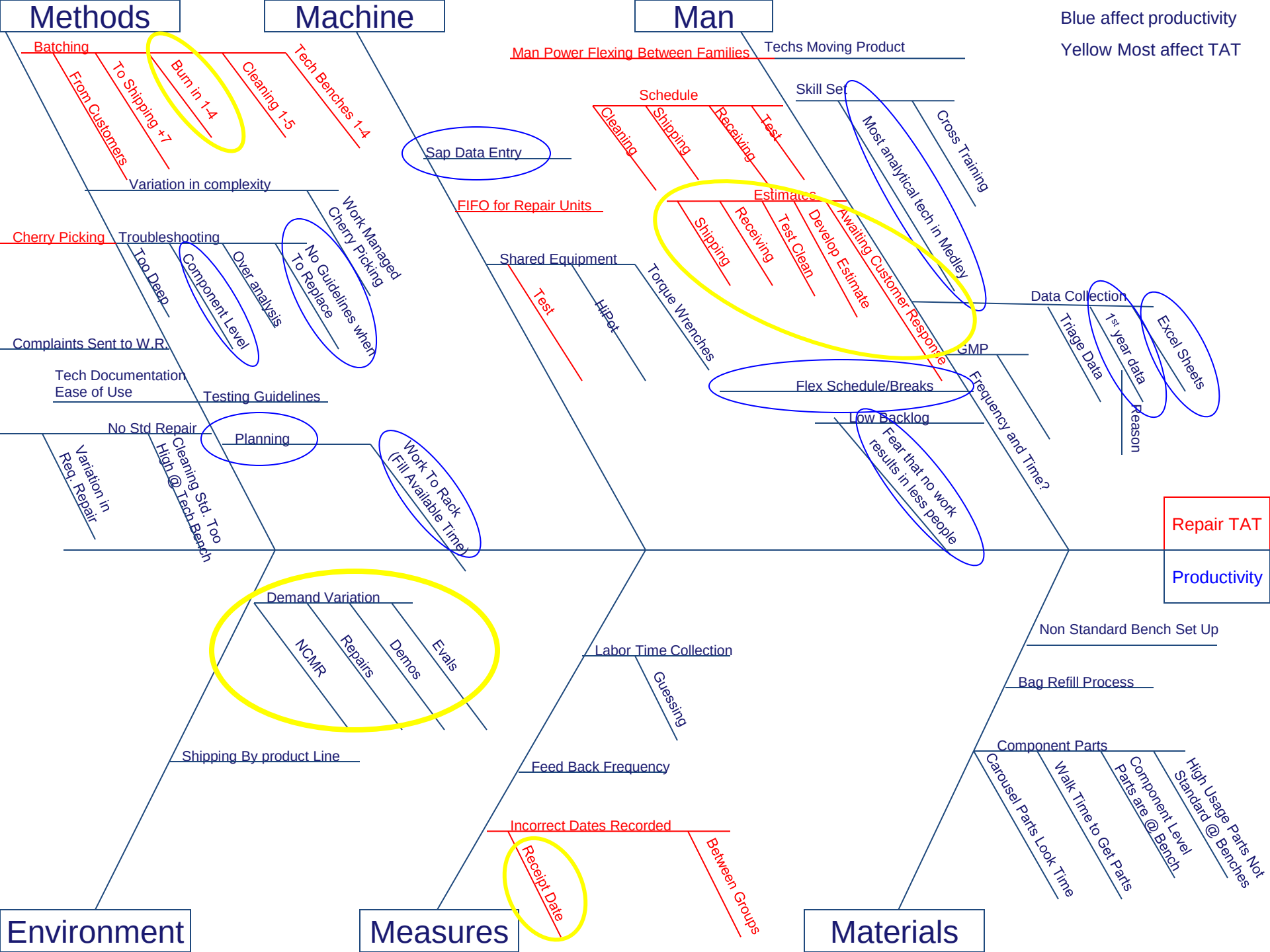


Cause-and-Effect Diagram (continued)

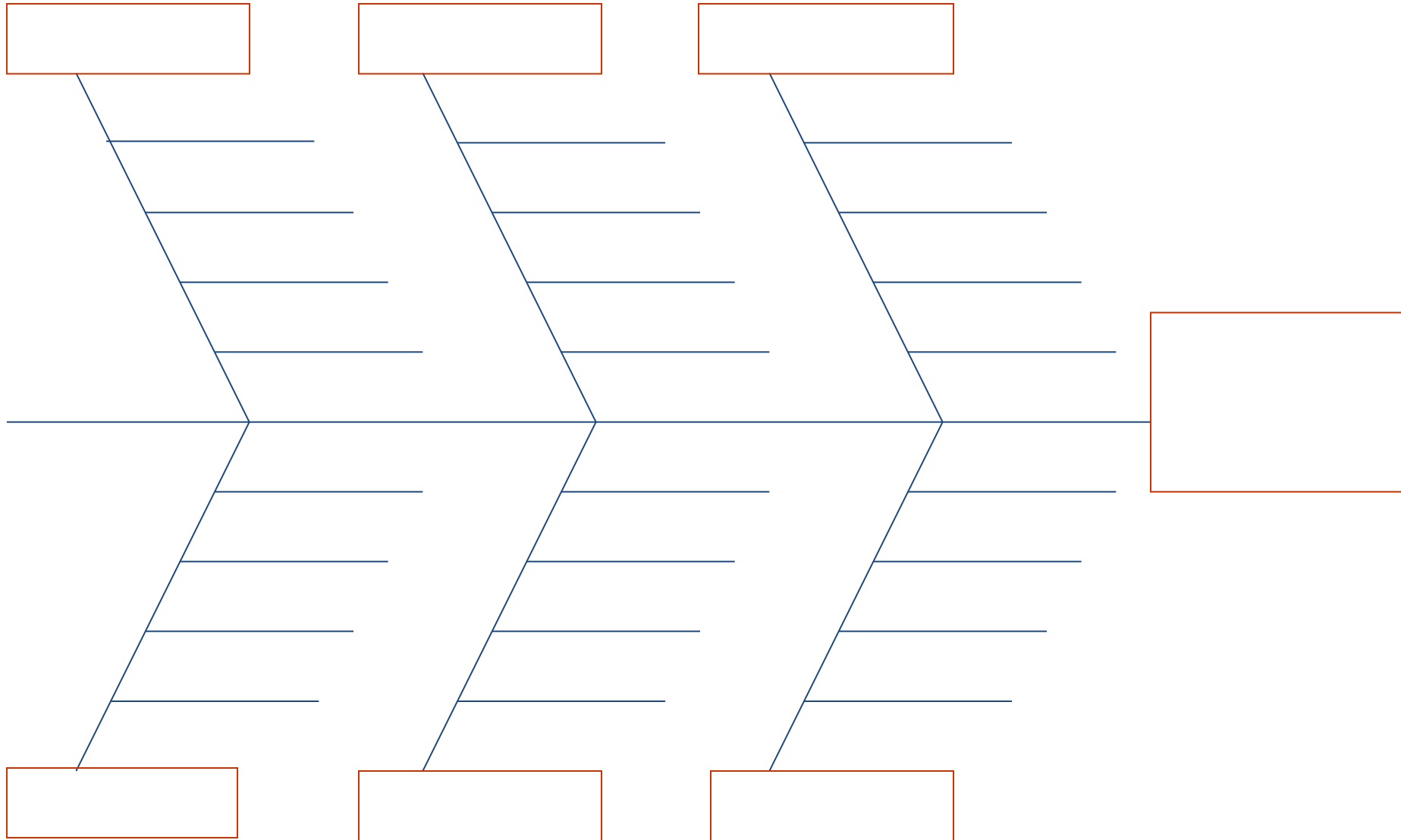
- Effective brainstorming tool
 - Forces teams to consider *all* possible causes
- Decreases the likelihood that something is being overlooked
- Shows us the possible causes, but not how much each contributes, if at all, to the problem
- Does not provide solutions / countermeasures

Cause-and-Effect Diagram





Cause-and-Effect Activity





Check Sheets

- Help collect and record process data in an organized way (how often are certain events occurring?)
- Provides factual data to help analyze process (transition from subjective to objective)
- Detects patterns
- Includes “likely candidates” from Cause-and-Effect Diagram (the relevant few)
- Basis for Pareto Analysis
- NOTE: Make it easy & collect data for limited period of time only

Root Cause Analysis: Late Shipments

Check Sheets Quantify Occurrences

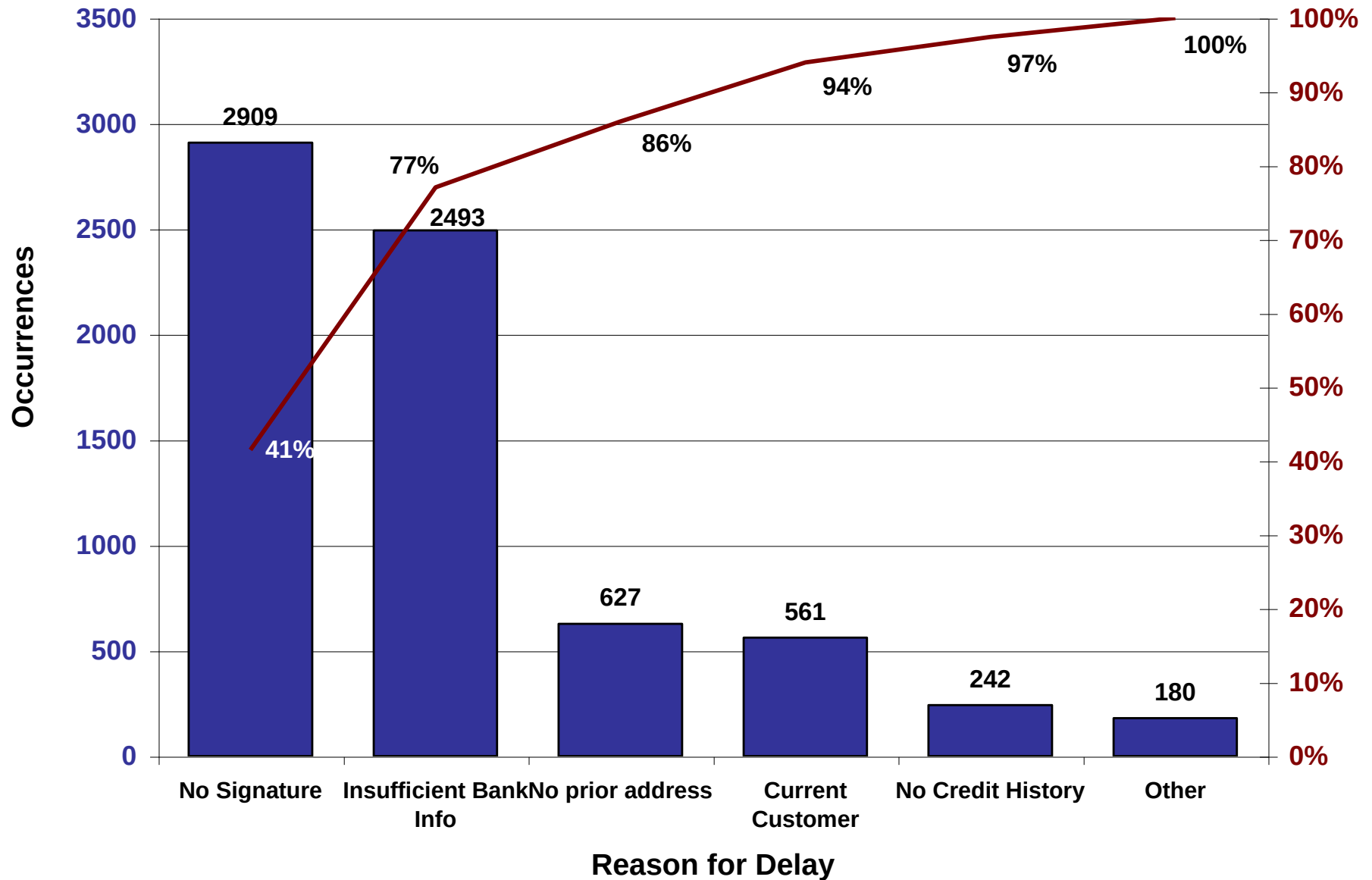
Reason	Tally						
Material shortage							
Quality issue requiring rework							
Staffing/absenteeism							
Order entry error							
Changing customer requirements w/ no adjustment to expected delivery							
Equipment failure							



Pareto Analysis

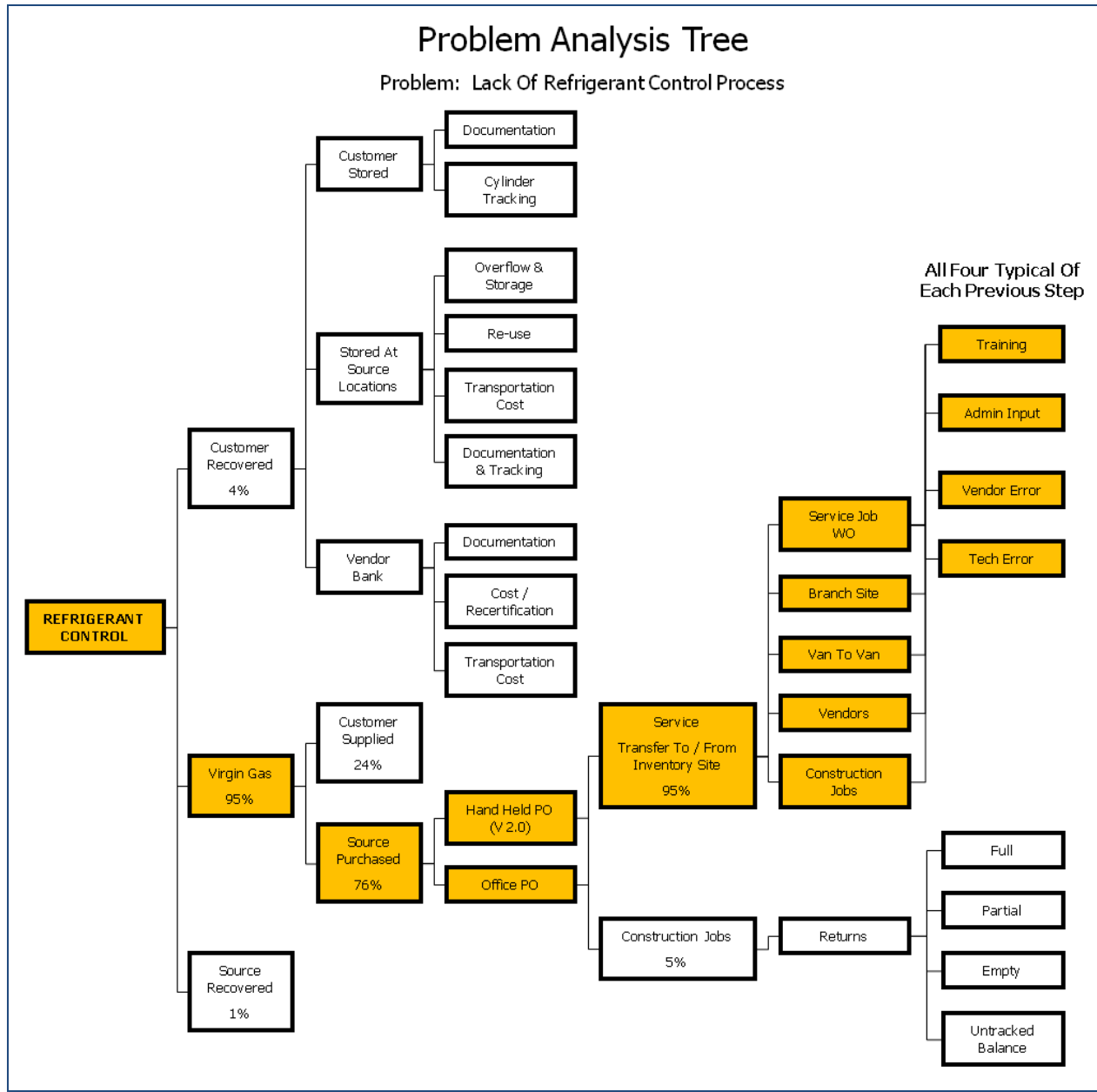
- Named after Wilfredo Pareto (18th century Italian economist/statistician) who discovered the 80-20 principle.
 - 20% of the people held 80% of the wealth
- Focuses our attention on the VITAL FEW issues that have the greatest impact to avoid spending energy on the TRIVIAL MANY.
- A type of bar graph that displays information/data in order of significance.
- A visual aid for defining & ***prioritizing*** problems.

Pareto Chart Credit Application Delays



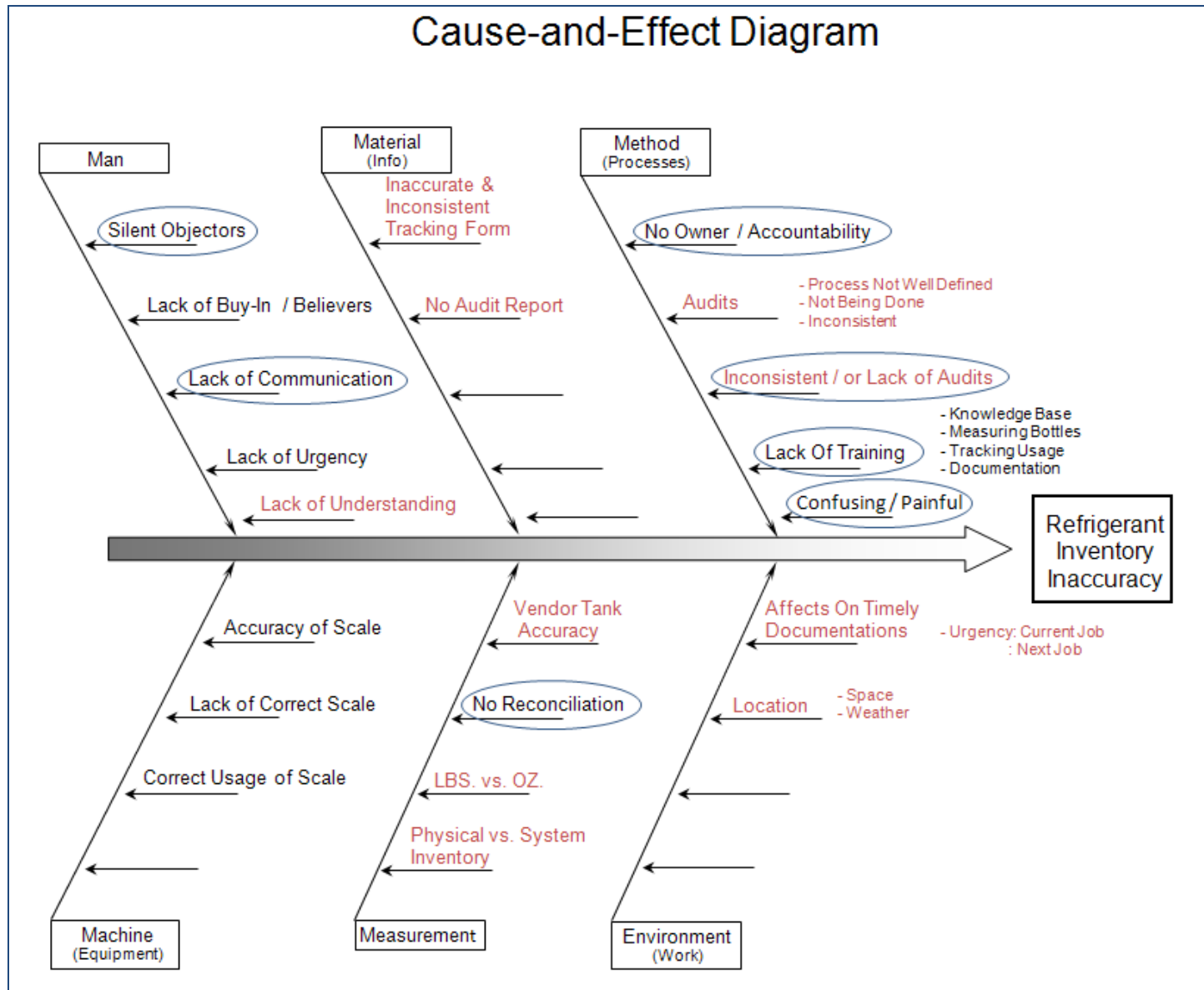
Sample A3

Root Cause & Gap Analysis



Sample A3

Root Cause & Gap Analysis





Class Activity

Begin performing root cause analysis for your class project (or determine which tools are relevant)

15 mins to work



**Nailing the left side of the
A3 report is the most
important element in the
entire process.**



Left Side Reminders

- Background
 - Need to **quantify** the problem to reduce subjective / emotional responses
 - Financial
 - Labor effort (which can be monetized)
 - Lead time / responsiveness (which can be monetized)
 - Market share
 - Compliance-related
 - Problem definition – proper scoping is vital!
 - Recommendation: Include one very specific problem statement in background section.



Left Side Reminders (continued)

- Target Condition / Desired state
 - Targeted performance metric, not the solution!
 - Must include measurable objectives
 - Include both % improvement and the raw numbers (from what to what)
- Root cause
 - You cannot solve a problem without knowing it's root cause!
 - Avoid making assumptions - “Do you ***think*** or do you ***know***?”
 - When multiple root causes exist, ***quantify*** and select the relevant few for countermeasure development.



Left Side Reminders (continued)

- Displaying information visually aids ***tremendously*** in the absorption rate of the information
 - Pie charts, trend charts, graphs, bar diagrams
 - Drawings
 - Photographs
 - Problem trees, fishbone diagrams, Pareto charts
 - Process maps
 - Representations of the people involved
 - Anything that communicates information more quickly and effectively than words

Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: _____

Owner: _____

Background

Current Condition

Target Condition / Measurable Objectives

Root Cause & Gap Analysis

Countermeasures / Implementation Plan

Effect Confirmation

Follow-up Actions



Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem?



Current Condition

- Diagram of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)



Target Condition / Measurable Objectives

- Diagram of desired state
- Measurable targets – how will we know that the improvement has been successful?



Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
- When?
- Where? (if relevant)



Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?



Follow-up Actions

- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?

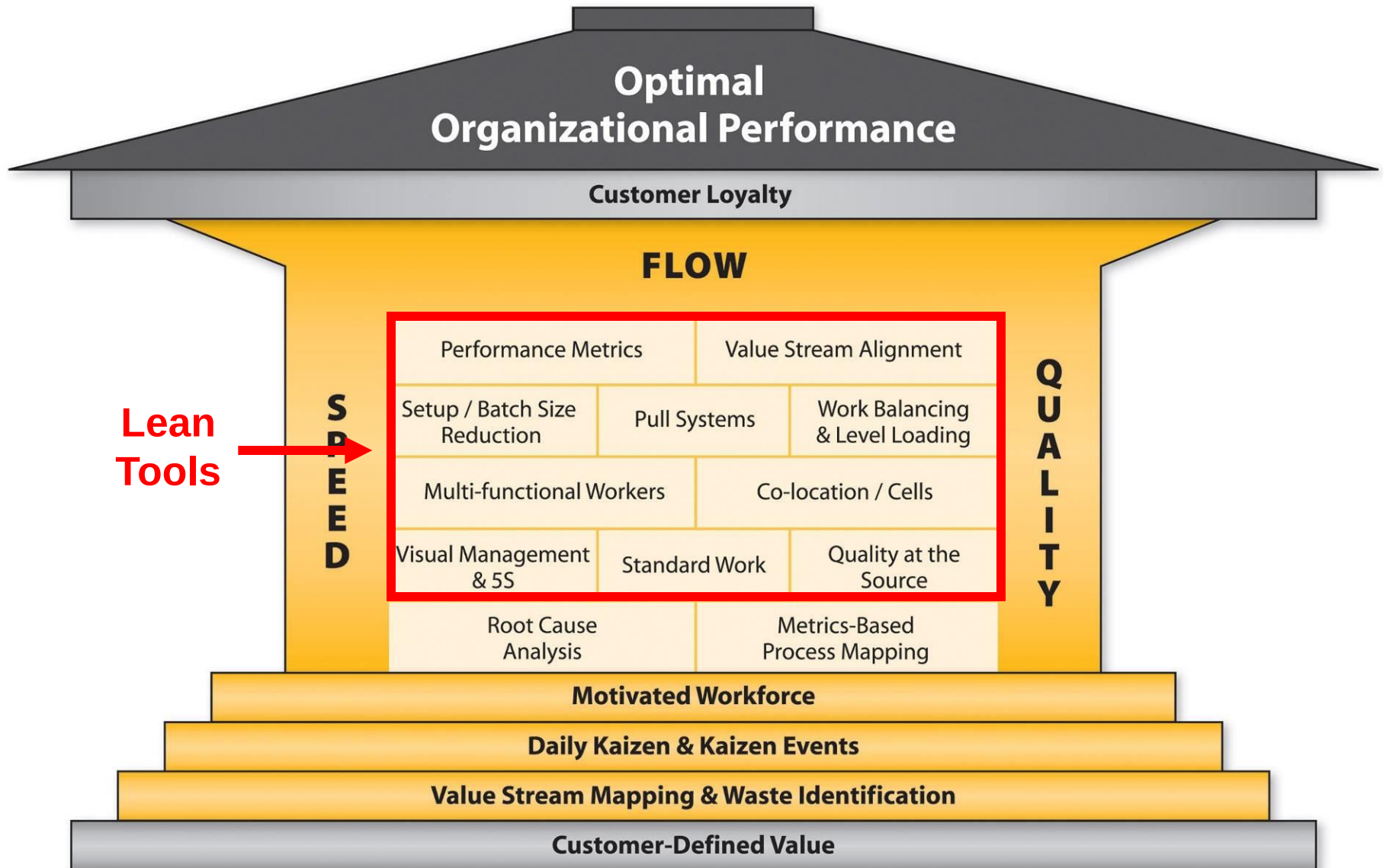




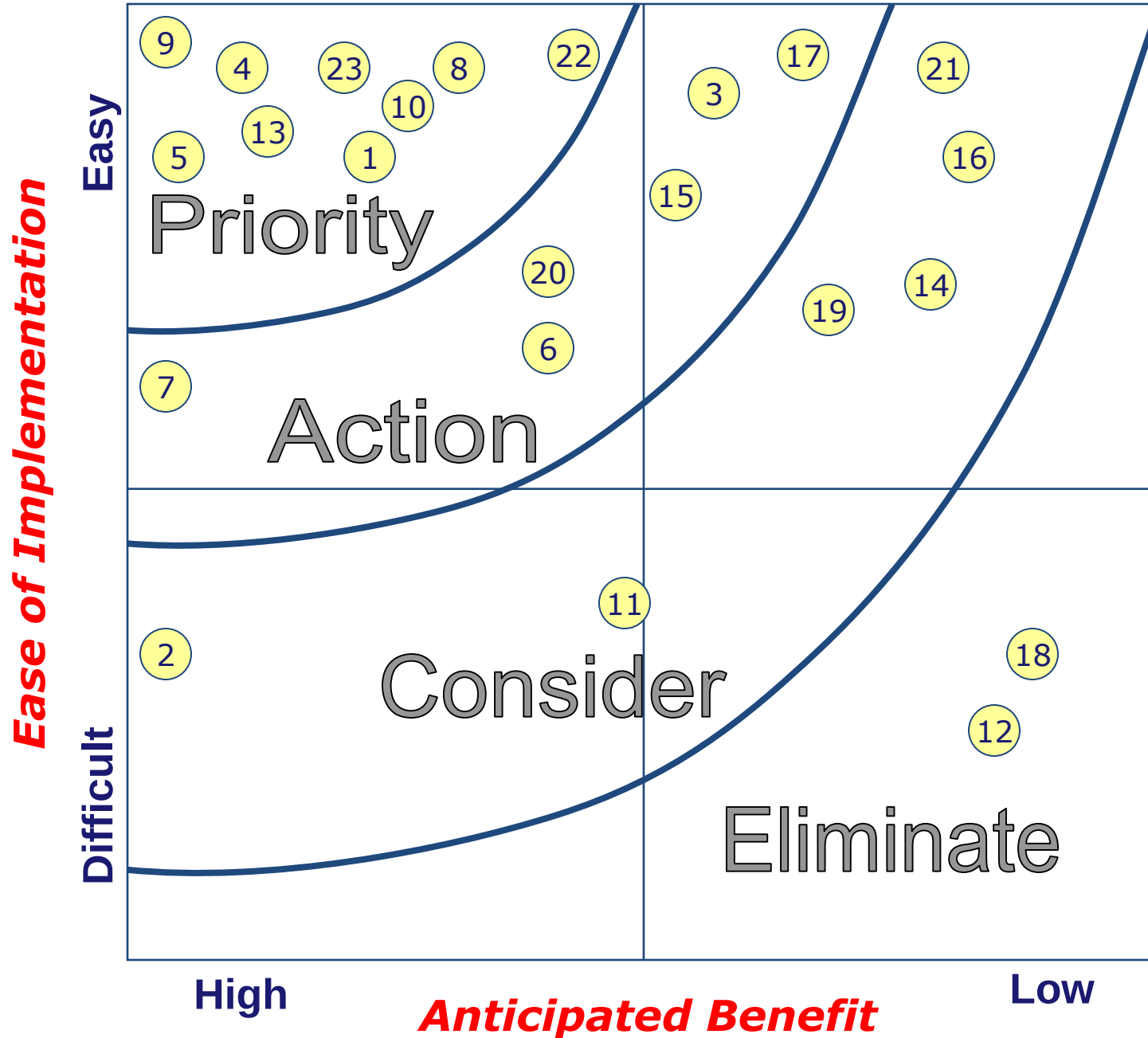
Once you know the root cause, brainstorm and prioritize solutions

1. List relevant countermeasures.
2. Eliminate those that aren't possible.
 - Regulatory, budgetary, resource availability, system capability, etc.
3. Combine those that are similar.
4. Number the countermeasures sequentially.
5. Place countermeasures accordingly on the PACE Prioritization Grid.

Building a Lean Enterprise



PACE Prioritization Matrix





The A3 Report: Countermeasures / Implementation Plan

- Consider all options
 - Be innovative – be willing to challenge your paradigms and help others challenge their own
- Make sure the countermeasure is directed very specifically to the key root causes
- Make is clear exactly what will be done, **by whom**, when, where, how, in what order
 - Gantt charts can be helpful
 - How often will the implementation plan be reviewed?
- Aim for full implementation by a specific date
- At this point, the problem owner's key roles shifts to advocate and project manager
- Cross-functional involvement and consensus is a vital success factor

Sample A3

Countermeasures / Implementation Plan

Task	Accountable	Due Date	% Cmplte		Complete Date
Improved Technician's Refrigerant Tracking form that includes directions	Hugh		100	25	04/17/09
			75	50	
Surveys done with Service Managers: cycle counting/auditing	Ramona/Shawn/ Bryan		100	25	04/20/09
			75	50	
Cycle count of refrigerant on 3 vans: using old and new form	Landon/Ramona		100	25	04/21/09
			75	50	
Surveys done with Service Admins/Dispatch on current auditing process & forms	Ramona		100	25	04/24/09
			75	50	
Technician Visual Aide on Refrigerant: types; cylinder wt gross/empty; charge orientation; Refrigerant Safety; Disposal /Weighing Procedures	Bryan / Hugh /Shawn		100	25	05/07/09
			75	50	
Refrigerant Control and Tracking section in the Tech Guide	Bryan		100	25	05/07/09
			75	50	
Selected Branch in each Region for Pilot Tracking Program -approved by Regional Director - 5 Site ID's for each Region	A-Team		100	25	05/01/09
			75	50	
Revised Current Existing Source Pallet Refrigerant Report for Auditing Purpose	IT - Ramona	05/08/09	100	25	
			75	50	
Created Refrigerant Audit Form per Region	Ramona / Hugh	05/15/09	100	25	
			75	50	
Select Admins for each Region for tracking and auditing function	Regional Director /	05/20/09	100	25	
			75	50	
Created Detailed Refrigerant Control Procedures	Ramona	05/21/09	100	25	
			75	50	
Determine Owner of Refrigerant Tracking Process	TBD / owner	05/21/09	100	25	
			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.	A-Team	05/27/09	100	25	
			75	50	
Training Program for Admins for Auditing Process - 'Go-To-Meeting' : 1st Phase: admins in Pilot Program 2nd Phase: all remaining admins	A-Team	05/27/09	100	25	
			75	50	
Individual Branch Performance Score Card for Refrigerant of Write-Offs	Shawn	06/01/09	100	25	
			75	50	
Run Pilot Program for 3 months; track progress; reports to Regions/Branches> start 6-1-09	1-A-Team member per region	09/01/09	100	25	
			75	50	
Company Wide Implementation	TBD / owner	09/28/09	100	25	
			75	50	
Exception Reports for Managers/Admin: 1) >150# on trucks and Negative Balances 2) \$ per Lb. discrepancy on PO's per	IT / Shawn/Ramona	07/01/09	100	25	
			75	50	
Hand Held 2.0v - Purchases of Refrigerant thru Hand Held to eliminate 80% PO/Vendor/Admin error >> cycle count;	IT / A-Team	TBD	100	25	
			75	50	

Common Components of the A3 Report

Plan

Do, Check, Act

Theme: “What is our area of focus?”

Background

- Problem statement
- Context - why is this a problem?

Current Condition

- Diagram of current situation or process
- What about it is not ideal?
- Extent of the problem (metrics)

Target Condition / Measurable Objectives

- Diagram of desired state
- Measurable targets – how will we know that the improvement has been successful?

Root Cause & Gap Analysis

- Graphical depiction of the most likely direct (root) causes

Owner: Person accountable for results.

Countermeasures / Implementation Plan

- What?
- Who?
- When?
- Where? (if relevant)

Effect Confirmation

- What measurable results did the solution achieve (or will be measured to verify effectiveness)?
- Who's responsible for ongoing measurement?

Follow-up Actions

- Where else in the organization can this solution be applied?
- How will the improved state be standardized and communicated?



The A3 Report: Effect Confirmation

- Tie confirmation directly to the target condition.
- Define 2-5 key performance indicators (KPIs).
- Determine ways to verify the effectiveness of the countermeasures, one by one if possible.
- Plan in advance for the data that will need to be collected.
- Identify who will help collect the data and how frequently.

Common Components of the A3 Report

← **Plan** →

← **Do, Check, Act** →

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The A3 Report: Follow-up Actions

- How will you communicate the new process?
- Who will monitor the process?
- Which metrics will be used to measure ongoing performance?
- Look for similar processes within the department and across the organization that can benefit from these countermeasures
- Ensure ongoing improvement – who will do this?
- Share the wealth!
 - Communicate results across the organization and teach others to problem-solve via the A3 process

Sample A3

Effect Confirmation & Follow-up Actions

Effect Confirmation

<u>Task</u>	<u>Accountability</u>	<u>Frequency/Due Date</u>
• 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

<u>Task</u>	<u>Accountability</u>	<u>Frequency</u>
• Monitoring all processes and inventory variances	TBD- Owner	Quarterly
• Update Metrics for Branch Score Card	TBD- Owner	Quarterly



The *process* is
as important as
the results.





Additional A3 Considerations

- A3 Roles & Responsibilities
 - Problem Owner – Person(s) accountable for results; authorized to engage any and all parties needed
 - Problem Coach – Person(s) “developing” the process owner into a skilled problem-solver; typically leadership.
- A3 vs. Value Stream Mapping – how they work together (or separately)

PDCA: Plan Stage

Primary
problem-solving
role:
Investigator

*“Do you think or
do you know?”*





PDCA: Do-Check-Act Stages

Primary
problem-solving
role:
Director

“Action!”





Other A3 Applications and Common A3 Components

- Proposal
 - Theme
 - Background
 - Current Condition
 - Analysis and Proposal
 - Plan Details
 - Unresolved Issues (if relevant)
 - Implementation Schedule
 - Total Effect
- Status Report
 - Theme
 - Background
 - Current Condition
 - Results
 - Unresolved Issues / Follow-up Actions
 - Total Effect



In Summary

A3 reports should become a standardized form of currency for problem-solving, dialogue, and decision-making in your organization— creating an organization of “scientists” who continually improve operations and achieve results through constant learning from the work at hand.