

VILLAGE OF SHOREWOOD LEAN RESOURCE MANUAL

Continually reducing waste and improving work flow



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**Business Performance
Solutions**



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PART 1: LEAN PROCESS & METHODS

Introduction

The Village of Shorewood is seeking to identify ways to serve the community more effectively and less expensively by utilizing Lean principles, practices and methods. The **Lean Vision** for the Village of Shorewood is to expand on a culture where people contribute meaningful work to improve the internal operations and build an organization where employees want to make a difference. Thinking deeply about purpose, process, and people will guide a transformation.

What Lean Is

Lean involves a set of principles, practices and methods for designing, improving and managing processes. It is aimed to improve efficiency by eliminating particular kinds of waste which absorb time and resources but do not add value. A Lean process reflects the goal of continually reducing waste and improving work flow to efficiently produce a product or service that is perceived to be of high value to those who use it. Implementation of Lean involves systematic process assessment and analysis.

Six Sigma, like Lean, is a business management strategy used to improve the quality and efficiency of operational processes. While Lean focuses on identifying ways to streamline processes and reduce waste, Six Sigma aims predominantly to make processes more uniform and precise through the application of statistical methods.

Various combinations of Lean and Six Sigma techniques have been developed, which frequently are described as Lean Six Sigma approaches. The blended approach points to the common process-centered and data-driven foundations of both Lean and Six Sigma. The combined approach benefits organizations because it utilizes both the customer-orientation and focus on eliminating waste inherent in Lean along with the statistical tools used in Six Sigma.

What Lean Is Not

Lean is not a tactic or a cost reduction program, but a way of thinking and acting for an entire organization. It is not about figuring out new ways to cut village personnel. "In America today we have good people working in poor processes. What we want is good people working in great processes." MIT Professor Michael Hammer. The Village does not want to use this process to eliminate positions but rather reduce waste and extra steps in significant processes.

A Lean organization utilizes the knowledge of all employees to create a high performance organization; it searches for root causes, eliminates waste and reduces costs and resources required to do essential

non-value-added activities; and it is totally committed to continuous improvement. This takes a long-term perspective and systemic perseverance and requires commitment from all. Lean utilization improves delivery of services using a disciplined, project-based approach and using sound and consistent methodology. If time is reduced to provide a service, it will serve customers better and make people feel better about their work.

The word transformation or Lean transformation is often used to characterize an organization moving from an old way of thinking to lean thinking. Shorewood is taking this first step in changing how we do business.

Lean Methods

All Village Lean projects will utilize the process and tools outlined in this manual for problem solving and continuous improvement, methodologies created for Lean Six Sigma. The DMAIC methodology is the fundamental approach to begin the process. DMAIC and Lean (the combined methodologies are known as Lean Six Sigma) complement each other as the foundation for continuous improvement and eliminating waste.

There are two methodologies utilized in implementing Lean continuous improvement. One is DMAIC, consisting of five steps: Define, Measure, Analyze, Improve and Control. The other method is PDCA, which stands for Plan, Do, Check, Act.

Method: DMAIC

DMAIC can be thought of as a roadmap for problem solving and process improvement. It is an acronym that stands for the process of defining, measuring, analyzing, improving and controlling.

①

DMAIC

DEFINE

Define the problem and/or project

MEASURE

Measure the current process

ANALYZE

Analyze the sources of the problem

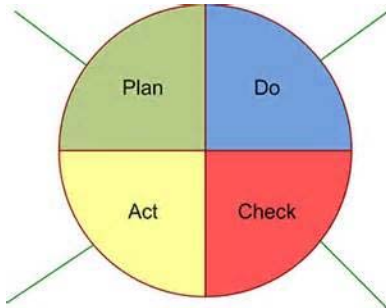
IMPROVE

Improve the process and reduce or eliminate waste

CONTROL

Control the new process so problem doesn't reoccur

② PDCA



Plan: What is the problem or opportunity? Ensure the context and scope of the project is correct and appropriate.

Do: Quantify the current situation. Ask why this problem occurred. Implement.

Check: Monitor the effectiveness. If results achieved, go to Action. If results not achieved, go back to Do.

Act: Standardize the change and know if any other problems surfaced.

This manual provides instructions in how to implement a Lean project using the DMAIC method and becoming a Lean Organization. The PDCA is further explained in Part II.

SECTION 1: SELECTING A PROJECT

Suggestions and ideas for projects are submitted and evaluated by the Process Improvement Resource (PIR) - Corrective Investigative Team and recommendations are reviewed by the Steering Committee. If a particular problem becomes a priority of a department manager, the manager works with the Steering Committee to initiate a project and/or team as well.

ACTIONS: Once a project is decided on, a team is formed. At the first meeting, the team reviews the project to see if it can be narrowed and all members sign the **Meeting Guidelines** (Appendix A) form.

Narrowing the project

Once a project is chosen, further review is necessary. Most projects need to be broken down into subprojects. Each one may feel small and not providing sufficient improvement; however, even with limited time applied, large improvements come over time. Identify if there is something meaningful that can be improved in 90 days. Ask these questions:

- What are the subset issues of the problem?
- Can you list the top three things that cause, or are parts of the problem?
- Can you select one of the subset issues to work on? Will it still be meaningful?

For example- *Original Project:* Reduce the time to approve all purchase orders
Narrowed Project: Reduce the time to approve machine repair purchase orders

Attributes of Good Teams

When a project team is formed and before the project begins, the team reviews meeting guidelines and each member gives a signed copy of the form to the Steering Committee (appendix A). Meetings need to be closely managed because we don't have unlimited time. It's important to keep the project results at maximum speed to eliminate improper project scope expansion, focusing on minor items instead of the major ones, and minimizing irrelevant conversations.

General Meeting Guidelines

- 1) Meetings are held only when necessary and effective to accomplish the objective.
- 2) Everyone 'checks their titles at the door' regardless of titles.
- 3) Appropriate people are notified as to who is in the meeting.
- 4) Agendas (if necessary) are sent out to team members in advance.
- 5) Meetings start on time.
- 6) Meetings are held with minimal interruption.
- 7) Meetings end on time.

Participation in meetings

- 8) No person(s) dominate the conversation.
- 9) Information required for discussion is provided in advance when expected or is complete when necessary to bring to the meeting.
- 10) People are 'present' in the current meeting, one person talks at a time.
- 11) People are treated with respect.
- 12) Discussion is kept on task and on time.
- 13) Assignments are given and accepted where appropriate with the expectation of being completed when agreed upon or the appropriate people are notified well in advance (as soon as realized) of the anticipated due date.
- 14) A question of whether anyone else has input should be asked at the end of the meeting.

Decision making

- 15) Data is expected to be presented for decision making.
- 16) The team defers a decision to the most appropriate team member.
- 17) When appropriate, the three C's of decision making employed (Command decisions, Consensus decisions, and Consultative decisions) with 'consultative' being most used.
- 18) Meetings should employ decision making tools when appropriate.

SECTION 2: DEFINE PHASE

The project starts with the Define Phase. In the first meeting, the team creates a specific definition of the problem. Know the customer and their need. Begin project communications and meetings when appropriate. At the end of each step, look for “low-hanging fruit” and make safe, simple improvements where appropriate.

Define Actions: Complete a **Problem Statement** form and a **SIPOC Diagram**; start completing the **A3 Report** sheet; complete a **Team Charter** and hand in to the Steering Committee; do a **flowchart** of the existing process and use the **SIPOC** tool.

STEP 1: Complete Problem Statement

A **Problem Statement** is the first step in problem solving. Complete the Problem Statement worksheet found in Appendix B. Elements of the Problem Statement include:

Problem Statement Worksheet Template

Appendix B

ELEMENTS OF THE PROBLEM STATEMENT
Write a few sentences that describe the problem. Just list the problem.
Are there subsets of the problem to focus on?
What is NOT to be included in the problem?
Do not include suspected causes or any suggestions for solution.
What is the impact/loss to the organization? Why and to what degree is a problem causing (i.e. poor customer satisfaction, dollars lost, time lost, stress on employees, etc.)? Use data if at all possible.
What is the current measurement of the problem (i.e. KPOV baseline measure) usually measured the requirements failed to be met, units, defective rate, money, time or a combination? Use data if at all possible.
When and how does the problem show itself?

Do NOT include: stating opinions of what is wrong; suspected causes of problem; anticipated solutions; assign blame; having more than 1 problem statement.

STEP 2: Complete SIPOC diagram

Before deciding what data to collect, complete a **SIPOC diagram**, which is a tool used by the team to identify all relevant elements of a process improvement project before work begins. It helps to define a complex project that may not be well scoped. It is similar and related to process mapping but provides additional detail.

The tool name prompts the team to consider the Suppliers of your process, the Intputs to the process, the Process your team is improving, the Outputs of the process, and the Customers that receive the process outputs. The SIPOC is good to use with Value Stream Mapping, described later in this section.

SIPOC Template

Appendix C

Suppliers (Providers of the Required Resources)	Inputs (Resources Required by the Process)	Process (Top level description of the activity)	Outputs (Deliverables from the process)	Customers (Person receives the outputs)
<div>Who provides each input?</div> <div>5</div>	<div>What inputs are required to enable this process?</div> <div>4</div>	<div>When does the process start?</div> <div>What's the process?</div> <div>When does the process end?</div> <div>1</div>	<div>What are the outputs?</div> <div>2</div>	<div>Who are the customers of each output?</div> <div>3</div>

STEP 3: Start A3 Report

The **A3 Report** is updated throughout the project and used to present the project when it is completed. The A3 gets its name because it is 11" x 17" in size, also known as A3 paper size. It summarizes the main points throughout the project, stating the problem, how the team will measure the problem, the goals, and the main causes. One team member is assigned to updating this form.

Begin completing the A3 report, entering team member names, title of project, team leader and process owner. Describe the current conditions, how often it occurs, what else happens when it goes wrong, costs, etc. Under the Goals and Target Conditions, determine how much the team expects to improve the process. For the Root Cause Analysis section, it shows what the team found to be the causes of the problem.

Through each phase of the project, the A3 report is updated and a copy is given to the Project Sponsor and the Lean Steering Committee.

A3 Report Template

Appendix D

11" x 17"

Title	Owner
	Date
Background	Counter Measure Proposal(s)
Current Conditions	
Goals/Target Condition	Who Action When
Root Cause Analysis	Follow Up

STEP 4: Complete Team Charter form

When a project group is formed, a **Team Charter** is completed and given to the Project Sponsor and Lean Steering Committee. Anyone who is in the process should signoff. The form gives the Steering Committee and department manager(s) a way to understand how much effort will be expended and by whom.

The Charter form outline

Appendix E

Project name	Project definition	Team name
Each member role	How often team meets	How long meetings
Who else receives team updates	What will be improved	What is current measure
How measure	What is desired goal	ID Lean strategies
Needed signatures		

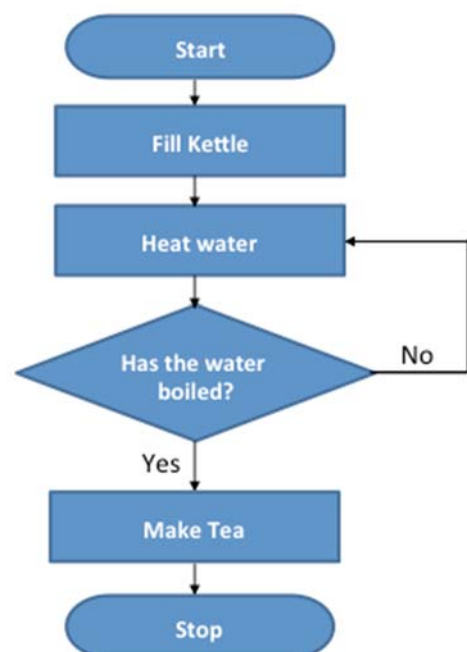
STEP 5: Complete a flow chart

A **flowchart** is a formalized graphic of a process, organization chart, or similar formalized structure. The purpose of a flow chart is to document the steps of an operation. The visual nature of the flow chart makes it useful for learning a process, for quickly checking the next step as a memory tool, or when reviewing the work of others. It is also a problem solving tool and is used to analyze in nearly every process improvement effort.

Flowcharts can show either the current state or the future state. Current state flowcharts show how a process is currently done. Future state flow charts show how the team would like to do the process.

A flowchart uses simple geometric symbols and arrows to define relationships.







Example (Making the Tea)



There are four basic symbols used in a flowchart and they can be created in Microsoft Word, Excel or other software.

The basic flowchart symbols are:

- **Rounded Rectangle / Oval:** This is a terminator. It marks the beginning and end of a process.
- **A Circle:** Circles are connectors that link one part of a flowchart to another. It is commonly used for subroutines or when a flowchart is too big for one page.
- **A Rectangle:** A rectangle is a process box and shows the step.
- **A Diamond:** A diamond is a decision point, and indicates a location where a process branches into two or more paths. A decision point may occur when an active choice is made by the person doing the process, or when a process responds to an external event. Not all decision points come from controlled, planned choices. As an example, a flow chart may show an operator checking a gauge and responding based on whether it is within nominal ranges or if there is a problem.

Symbol	Represents	Example
	Start/Stop	Receive complaint Receive request Proposal
	Decision Point	Yes/No Agree/Disagree Pass/Fail
	Activity	Hold a meeting Make a phone call Send a request
	Document	Report is completed Meeting minutes Forms filled out
	Connector	Go to another page or another part of the flowchart
	Delay	Waiting for a service Report sitting on a desk

SECTION 3. MEASURE PHASE

The Measure Phase involves creating a measurement plan and collecting data. Measurement is critical throughout the life of the project and as the team focuses on data collection, there are initially two focuses: determining the start point or baseline of the process and looking for clues to understand the root cause of the process. Since data collection takes time and effort it's good to consider both at the start of the project.

MEASURE ACTIONS: The team schedules a meeting to determine metrics. Complete a **Data Collection Planner** (Appendix F) and data collection **Data Collection Checksheet** (Appendix G) form and assign who will be collecting the data. After the data is collected and if the project warrants, complete a **Value Stream Map**. A **Spaghetti Diagram** may also be helpful to review process/paper flow.



Data must be collected a minimum of two weeks before any recommended changes take place.

The Process Improvement Measuring Team is available to assist with developing, collecting and analyzing data.

STEP 1: Identify what Data to Collect & Complete Data Collection Planner

It is important to get current baseline numbers on how the process performs or on the quality characteristics. Often it is helpful to focus on a metric that is meaningful to the customer and another that will resonate with the organizations goals. It is important to measure in years and not months, as part of the control phase (DMAIC). It's very important to properly explain why the data is being collected, how it will be used, and ensure all know how to collect the data.

First, your team must establish the current state or the baseline of the process before making any changes. The baseline becomes the standard against which any improvement is measured. This is a key step as the data collected will be used throughout the life of the project.

Examples of Key Indicators

Time Based			
Lead Time- to accomplish job	% on time delivery	Wait time	Productivity time
Value added time	Non-value add time	Total processing time	
Cost Based			
Total process cost	Labor savings		
Quality Based			
Customer satisfaction	Rework steps/time	First pass yield-done right 1st time	% complete, accurate
Process Based			
Change in # of decisions required	Decrease in # of signatures required	Change in # of delays	Decrease in # of handoffs
Organization based			
Employee satisfaction	Turnover	Lean events conducted	Lean event participation
Lean training conducted			

Data Collection Planner

Determine how and when the data will be collected, how to display the data graphically, and how the data will be shared to relay the problem or tell the story. All team members complete this form together.

The **Data Collection Planner** (Appendix F) is the form used to identify what the **Key Process Indicators (KPIs)** are. The KPI is the data that indicates how a particular process is working. The measurement is often stated in terms of how often (especially what process went wrong), impact on money or time lost, how long did it take to fix the problem, etc.

For each **KPI**, answer the following questions:

- What is being measured?
- How is the issue being measured?
- Who is responsible to be sure data is collected and is good data?
- Start date and Stop date
- How will data be graphically displayed/ communicated?

Tips to Avoid with Data Collection

The following table is an easy reference of guidelines surrounding data collection.

S ³ P ³ C ³ U ³		
S ³	Reporting the Data	
S	Safe	Should not point a finger
S	Shared soon	1 week best – 2 max before showing a chart or some use of the information
S	Simple Summary	Explain what the data means.
P ³	Collection of Data	
P	Polite	No harsh demands; ask for help
P	Persistent	Don't accept "no time", "forgot", etc
P	Professional	No personal hits
C ³	Decision-Making	
C	Command	Make very few, if any, decisions alone
C	Consensus	Making consensus very time consuming , so make very few of them
C	Consultative	Most decisions should be "I need your input to make a decision"
U ³	Data Collection Preparation	
U	Understood	All must know what, why and when
U	Uniform	All must collect data the same way
U	Utilized	All must see the process working

STEP 2: Complete a Data Collection Checksheet

A **Data Collection Checksheet** is a one-page form used to track data on how many times something occurred. It is also referred to as a tally sheet. It allows patterns and trends to appear and creates easy-to-understand data. When a problem occurs, what was the cause- lost time, lost money, etc. The items measured are the KPIs identified in the Data Collection Planner.

Data Collection Checksheet Example, measurement Time

Appendix G

	5	15	25	35	45	
Minutes lost	1-10	10-20	21-30	41-50	51-60	Total Minutes
ISSUE						
1) Missing info	II	III	I			80
2) Computer down				I		35
3) Waiting for callback		I			II	105

STEP 3: Do Value Stream Map

Value Stream Mapping is a picture of your process. It surfaces major issues and is the most significant tool to point out where there is waste in a process. The first step is to create a “current state” map, and then identify areas of waste. Ultimately, a “future state” map is created with plans how to get there.

To do the mapping, the team must understand the symbols used to complete a VSM and understand what value added and non-value added means.

Value Add (VA)

Value added is any activity the customer values (and in some cases is willing to pay for). Know who your customers are and what they really want. Improving value added activities is the foundational core of Lean. To be considered “value add”, a process step must have YES to all these questions:

- Does the customer care?
- Does it change the thing?
- Is it done right the first time?
- Is it required by law or regulation?

Non-Value Add (NVA)

Non-value added is any activity that consumes time and/or resources and does not add value to the service or project for the customer. These activities should be eliminated, simplified, reduced, or integrated. However, some non-value added activities may be essential, such as legal or regulatory requirements.

Unnecessary items may include waiting, processing, errors, defects, motion (people), transportation, underutilized people and inventory. The following table gives examples of various waste categories and examples. Waste is “anything other than the minimum amount of equipment, materials, parts, space and worker’s time which are absolutely essential to add value to the product.” Typically processes can have 10 – 30% of actual value added time of actual work being performed. The total elapsed time for a process of wasted time ranges 70 – 90%. An organization may be wasting upwards of 20% or more of the annual budget because of waste.

People must work smarter, not harder, to accomplish more with less. Quality of work life suffers when “waste” interferes with an employee performing effectively. The focus is to reduce or eliminate activities that mess you up, slows you down, and keeps you from doing the right thing correctly the first time.

Waste Categories

Waste Category	Office/Administration	
Over Production		
Generating more than the customer requires	<ul style="list-style-type: none">Giving more detail than necessaryGiving the customer too much detailProducing reports that nobody read	<ul style="list-style-type: none">Making extra copiesPrinting paperwork too soon
Over Processing		
Efforts that create no added value from the customer's view	<ul style="list-style-type: none">Creating reportsRepeated entry of data	<ul style="list-style-type: none">Use of obsolete standard formsUse of inappropriate software
Defects		
	<ul style="list-style-type: none">Data entry errorsPricing errorsMissing information/parts	<ul style="list-style-type: none">Missed specificationsLost records
Transport		
Moving between plants or offices or areas that does not add to the value of the finished goods or service	<ul style="list-style-type: none">Retrieving or storing filesCarry documents to and from shared equipmentWalking to/from copierTaking files to another person	<ul style="list-style-type: none">Going to get signaturesMoving parts and equipment in/out of storageMoving materials from one area to another
Inventory		
More materials or information on hand than is currently required	<ul style="list-style-type: none">Files waiting to be worked onOpen projectsOffice supplies	<ul style="list-style-type: none">Emails waiting to be read/filled In BoxUnused records in a databaseWork in progress
Movement		
Movement within a local area that does not add value	<ul style="list-style-type: none">Searching for files/ materials/ drawings/documentsAdditional keystrokes or clicksClearing away files from a deskGathering information	<ul style="list-style-type: none">Searching through manuals or cataloguesProcessing paperworkReaching for toolsWalking away to bring tools to area
Waiting		
Idle time created when people, materials, information, or equipment is not available when required	<ul style="list-style-type: none">Waiting for information, parts, drawingsWaiting for computersWaiting for machine repairs	<ul style="list-style-type: none">Queuing at the photocopierWaiting for peopleMeetings
Underutilized staff		
Idle time	<ul style="list-style-type: none">Limited functional responsibilities; skills too narrow/too many people are specialists.	

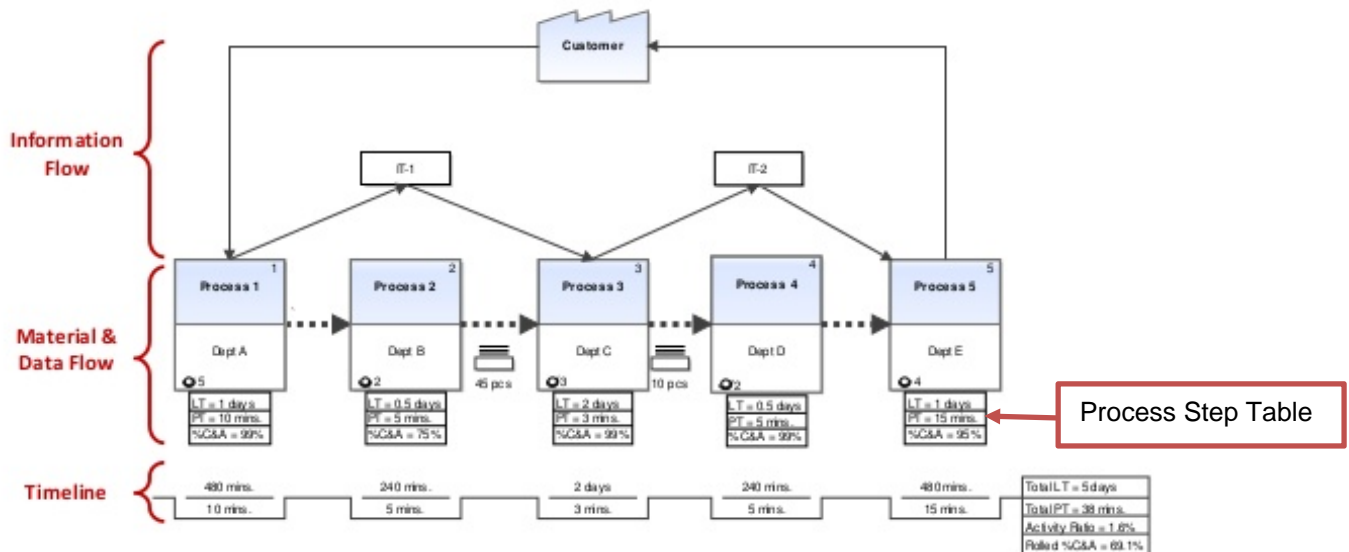
Parts of a Value Stream Map

A **Value Stream Map** (VSM) is dissected into three parts: how the information flows, how the data or materials flow, and the timeline. Most of the symbols created for VSM are used for the information flow part and found in Appendix H.

Below is an example of what a Value Stream Map looks like. On page 20 is an example of a project mapped on a wall- a result of a team meeting completing the first rough draft of the current state.

Part of the VSM includes a **Process Step Table** (Appendix I) that is repeated for each action identified. The table is used to describe the process in some detail, includes key steps and quantifies the total time available by all people involved in the process.

Basic Value Stream Map Example



The Process Step Table contains measurements that include process time, cycle time, setup time, lead time, turnaround time, frequency, percent completion and accuracy, revision time, number of people involved, downtime, queues of information and demand.

Key Attribute Description and Abbreviations in VSM

CT	Cycle Time = average time in minutes for the work element, includes value added and nonvalue added time.
PT	Process Time = average time in minutes to do the work element if left alone and you had everything you needed = Value Added Time and includes Essential Non-Value Added Time
QTY	Quantity = average quantity per time period, i.e. % accurate of complete.
RTFT	Right The First Time = % of time the entire process step is RTFT
C/O	Average changeover times
NVA	Non-Value Added confirmation
ENVA	Essential Non-Value Added Time
DEMAND	Demand - What is the daily demand, i.e. number usually requested to be completed in a set period

Example of VSM Process Step Table/data flow recording

Below is an example of the process step table that is part of the data flow in the VSM. The problem was to decrease the amount of time spent on issuing first-time night parking permits through Shorewood's customer service department. The first two steps of that process are below, and contain very specific actions and the time that it took for each step.

For the first step, one customer service staff is either called or a resident comes in and asks about where to park their car at night because there is no parking made available from their landlord. Staff confirms the address, grabs the village parking map and confirms where the person would like to park. This typically takes 3.5 minutes. This is done for every step in the process.

Process Step Example

Process: Confirm Address			
Process Steps	CT	PT	NVA
Greetings		0.5	
Retrieve map		0	
Confirm ALT location		3	
Totals		3.5 min	
Quantity			
Available Time -NA for this process			
Demand - NA for this process			

Process: Verify On-Street Supply			
Process Steps	CT	PT	NVA
Retrieve binder		0	
Confirm supply		1	
If supply, explain process		10	
If no supply, next step			
Totals		11 min	
Quantity			
Available Time - NA for this process			
Demand - NA for this process			

Value Stream Mapping Process

The entire team works on the VSM. Reserve a room and have a blank wall with large blank paper that will be your map. Have on hand the current process flowchart that was completed in the define phase and start mapping the current state. Utilize post-its, having different colors and make copies of the symbols, precut to stick on the map or make copies of the symbol sheet and cut and tape to a larger paper. Have plenty of markers as well.

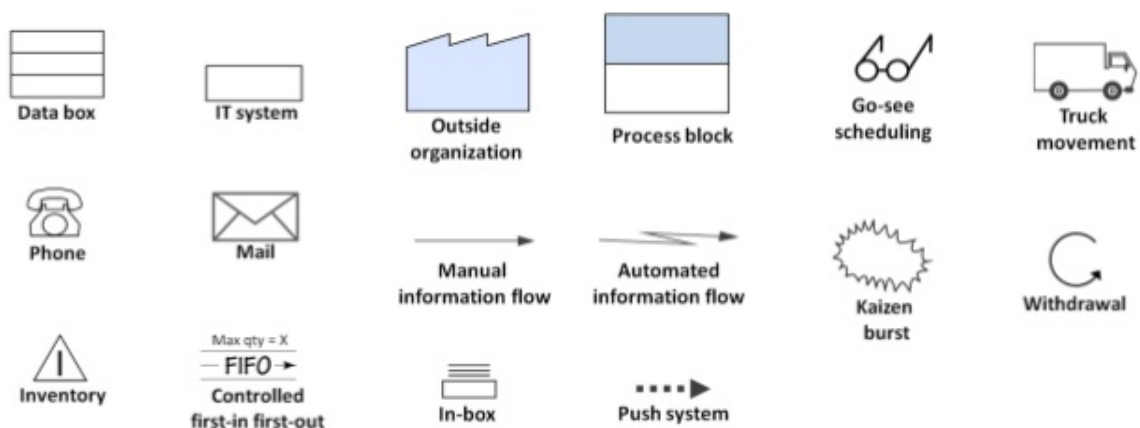
Once completed, take a picture and recreate on 11"x17" paper to use to create a "future state" map when standardizing any improvements.

Example Team Value Stream Map Exercise



Value Stream Map Symbols

Appendix H



STEP 4: Do a Spaghetti Diagram

A spaghetti diagram can be used to track people flow, paper flow or product flow. It is a visual representation using a continuous flow line tracing the path of an actual item or activity through a process. The continuous flow line enables teams to identify redundancies in the work flow and opportunities to expedite process flow.

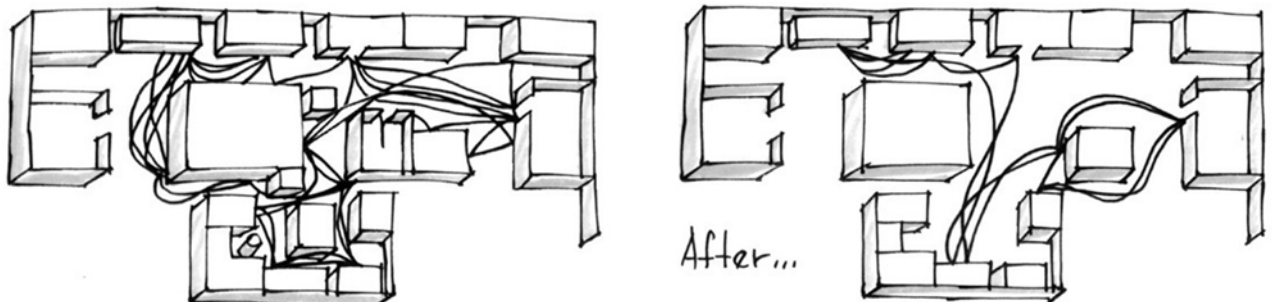
ITEMS NEEDED TO GET STARTED:

- Overhead views of area, drawn close to scale and labeled (make several copies and the larger the better)
- Colored Pencils
- Measuring Wheel and/or tape measure
- Stop Watch
- Team, Operators, People impacted by the flow
- Actual Process

Process

1. Record the processes on the side of the diagram.
2. Start at the beginning of the scope, the start of the first process. Use directional arrows for the routes that are traced on the paper.
3. Do not leave out any flow movement even if the paper becomes cluttered and difficult to follow. This probably indicates opportunity. Most often, the perceived unusual flows, or “exceptions”, are actually happening more often than is realized. Capture these!
4. Record the amount of time within each activity.
5. Show the areas where materials are stopped, staged, held, inspected and picked up. Look for point-of-use opportunities for materials, tools, and paperwork.
6. Record the names of those involved, dates, times, and other relevant information.
7. Calculate the distance, times, shift, starts, stops, to provide baseline performance.
8. Create a separate diagram showing the ideal state of flow for each that eliminates as much non-value added tasks as possible. The team should target the ideal state and the Project Manager should remove obstacles that may prevent this objective.

Example Spaghetti Diagram Before & After



SECTION 4: ANALYZE PHASE

In the DMAIC analyze phase, the team reviews data collected during the measure phase and analyzes it. The focus turns to identifying the root causes for the problems the Village, the customer, and the employees' experience.

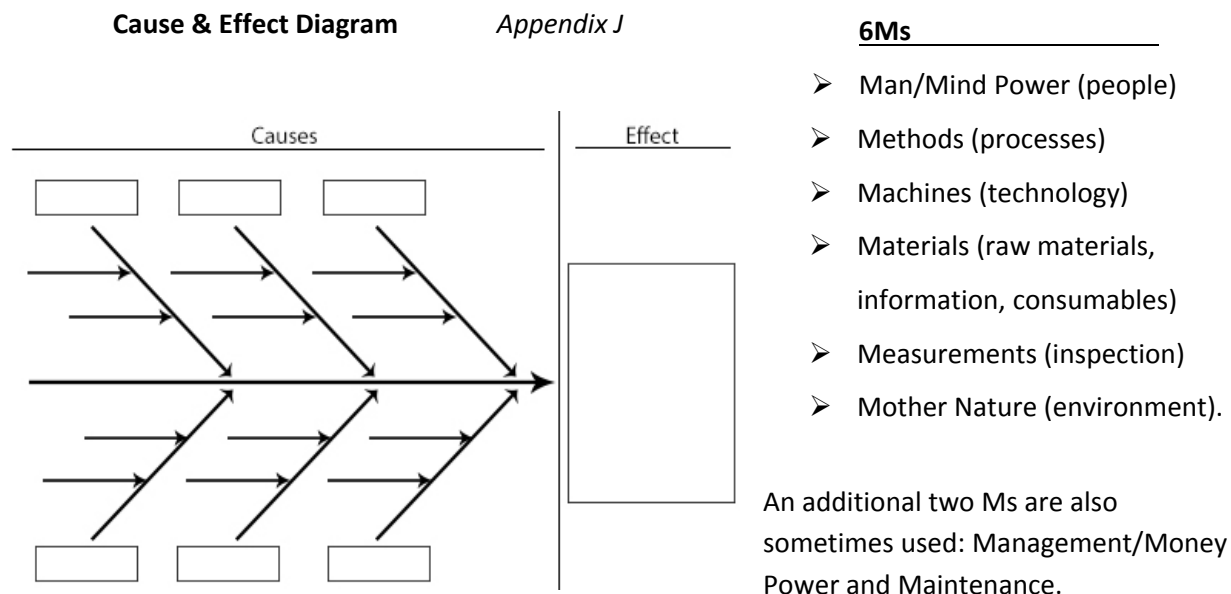
Analysis Actions: Use the **Cause & Effect** tool to analyze and **histograms** or **Pareto charts** to graph the data. Use the **5 Whys** to help identify root causes of the problem.

The Process Improvement Resource Measuring Team is able to assist with creating charts. The staff intranet provides the Microsoft Excel worksheet that has formulas embedded that will automatically generate graphics.

STEP 1: Evaluate Cause & Effect Diagram

A **Cause and Effect Diagram** (Appendix J) is a structured brainstorming tool designed to assist a team in listing potential causes of a problem and is great especially when a team's thinking tends to fall into ruts. From the VSM, select a problem issue to analyze.

Causes are grouped into major categories, which are the blank rectangles on the top and bottom of the diagram. The categories are classically defined as the 6 M.



Cause & Effect Process

1. Agree on a problem statement (effect). Write it at the center right of the flipchart or whiteboard. Draw a box around it and draw a horizontal arrow running to it. Feel free to also use the template.
2. Brainstorm the major categories which represent the different causes of the problem.
3. Write the categories of the causes as branches from the main arrow, which are the boxes at the top and bottom of the diagram.
4. Brainstorm all the possible causes of the problem. Ask: "Why does this happen?" As each idea is given, the facilitator writes it as a branch from the appropriate category. Causes can be written in several places if they relate to several categories.
5. Again ask "why does this happen?" about each cause. Write sub-causes branching off the causes. Continue to ask "Why?" and generate deeper levels of causes. Layers of branches indicate causal relationships.
6. When the group runs out of ideas, focus attention to places on the chart where ideas are few.

STEP 2: Complete a 5 Whys Form- a form of brainstorming

The **5-Whys** is a simple brainstorming tool that can help teams identify the root causes of a problem. Once a general problem has been recognized (either using the Cause & Effect Diagram or VSM), ask "why" questions to drill down to the root causes. Asking the 5-Whys allows teams to move beyond obvious answers and reflect on less obvious explanations or causes. Guard against using the 5-Whys on your own to avoid a narrow focus or bias.

This methodology is closely related to the Cause & Effect (Fishbone) diagram, and can be used to complement the analysis necessary to complete a Cause & Effect diagram.

It is said that only by asking "Why?" five times successively, can you delve into a problem deeply enough to understand the ultimate root cause.

5 Whys Diagram

Appendix K

Define the Problem:

Why is it happening?

1).

Why is that?

2).

Why is that?

3).

Why is that?

4).

Why is that?

5).

You don't want to list 5 different reasons; you want to go deep on 1 reason.

Caution:

- If your last answer is something you can't control, go back up to the previous answer on 1 reason
- Cannot because of a person

Potential Actions:

5 Whys Process

Get into your team. From the Cause & Effect Diagram, select an issue.

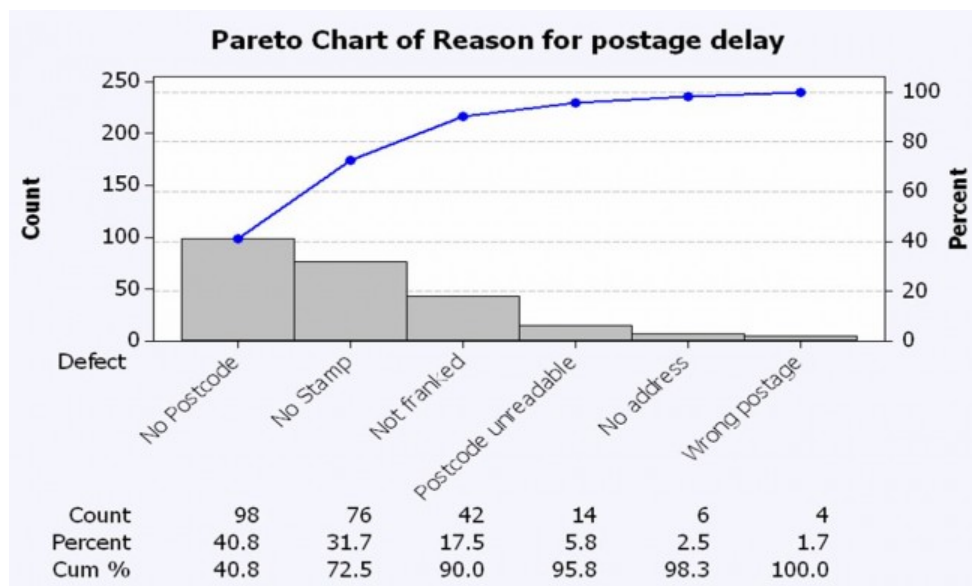
1. State the problem you have identified as a strategic problem to work on.
2. Start asking “why” related to the problem. Like an inquisitive toddler, keep asking why in response to each suggested cause.
3. Ask as many whys as you need in order to get insight at a level that can be addressed. You will know you have reached your final “why” because it does not make logical sense to ask why again. Ask 5 whys to see if you can get to a root cause.

STEP 3: Graphing/Pareto Charts/Histograms

Showing data in graphics and charts helps in recognizing a problem. A key graphic tool is the **Pareto Chart**. It takes data entered into Microsoft Excel and feeds it into a chart. A Pareto Chart template is available and set up for teams to enter data collected from the **Data Collection Checksheet**. Charts and graphs should be added to the **A3 Report** under Root Causes.

The example below has bars that represent the counts in each category. The arching line represents the cumulative counts of occurrences expressed as a percentage.

Example Completed Pareto Chart



SECTION 5: IMPROVE PHASE

Once the team is satisfied with the data, it's time to move towards a solution. For each of the root causes identified in the Analyze Phase, the team uses a brainstorming method to generate various alternatives to overcome the problem. You're most likely collecting improvement ideas throughout the project, but a structured improvement effort can lead to innovative solutions.

Improvement Actions: Develop a comprehensive list of solutions by **Brainstorming** and then evaluate the solutions using a **Decision Matrix** (Appendix L). Once a solution is identified, complete an **Action Planner** (Appendix M) to identify remaining tasks to implement. Teams continue to meet during implementation. Do a **5S** event when appropriate. Remember to keep updating the **A3 Report**. When completed all items in the Action Planner, present your project to your sponsor, the Steering Committee and others directly impacted by the process improvement.

STEP 1: Complete a Brainstorm event

The team's efforts at this stage are to produce as many ideas as possible based on the idea that from quantity, comes quality. There's many ways to brainstorm, but the process best for Lean involves the following steps:

1. The problem is stated to the team and the current challenges. Others outside of the team may join.
2. Supply paper/pen to each participant and have them write down as many ideas/solutions to the problem.
3. Write ideas down, no more than 10 words per thought. Give enough time for everyone to exhaust their list. Do in silence.
4. Select a facilitator who asks one team member at a time to share his/her first idea - write on flip chart and put a letter next to it, starting with the letter A.
5. Brainstorming rules apply: no discussion, judgment or criticism allowed (no noises and watch body language). Facilitator enforces these rules.
6. Go around the circle of participants, each sharing one idea at a time, record and letter them as fast as possible.
7. If a participant does not have an idea or an idea is already stated - he / she says "pass."
8. Let members build on one another's idea - "mental leap-frog."
9. Continue until all ideas are recorded. Follow brainstorming rules throughout, particularly with the last idea.
10. Combine similar ideas. Must get permission from both to consolidate.
11. Team reviews the solutions and decides which ones to pursue further.

STEP 2: Complete a Decision Matrix

Appendix L

The **Decision Matrix** enables the team to take top issues and rate them against multiple criteria, especially if there are conflicting options. It allows the team, not one individual, to decide what's important.

The Decision Matrix template table is available in Microsoft Excel and is set up for teams to enter the criteria, solutions and criteria weight. The following table is a template of the Decision Matrix.

Decision Matrix Process

1. **Identify criteria and assign weights.** Identify between three and five criteria and add to the column of the matrix. Each criterion is assigned a weight value between 1 and 3 with 3 being the more important criteria. The team determines what solutions are more valid or important, and assigns them a weight of 3. The total weighted score for all criteria must equal 10.

The following are examples are criteria most commonly used. Choose from this list or create new criteria to best fit your solutions. The underlined words and phrases are the criteria.

Criteria

- ✓ Is the solution Goof Proof (easy and understandable)
- ✓ Is the solution Quick &/or Easy to Do
- ✓ Will the solution Improve Customer Satisfaction
- ✓ Does the solution Simplify the Process
- ✓ Does the solution Require Minimal Resources
- ✓ Will the solution Increase Costs
- ✓ Can the solution be Maintained
- ✓ Is Training Involved
- ✓ Is there Space Savings
- ✓ Would there be Cultural Acceptance
- ✓ Will it Reduce Stress
- ✓ Will it improve Quality of Work Life

2. **Add solution ideas.** Take the agreed upon list of solutions generated through brainstorming or other means and enter in the top row of the matrix.
3. **Each member completes a Decision Matrix,** entering a score between 1 and 5, with
 - 1 = solution has no impact
 - 2 = some impact
 - 3 = strong impact
 - 4= very strong impact
 - 5 = extreme impact

4. **Total team scores.** Enter total scores in the Microsoft Excel table, which is set to tabulate the scores for each listed solution. The solutions with the two highest scores are discussed to assess feasibility and appropriateness of each of the solutions. The team may feel that some high scoring solutions may not be feasible or appropriate, and so discard.

Below is a section of the Decision Matrix, explaining each component. The following table is an example of a completed matrix.

Decision Matrix Template

Team and Members Performing Analysis:			
Problem Or Issue Under Study:			
Date Performed:			

↓ Criteria		Solutions or Ideas To Be Evaluated	
1	Criteria Weight	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____
2	Criteria Weight	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____
3	Criteria Weight	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____
4	Criteria Weight	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____
5	Criteria Weight	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____	<div style="display: flex; justify-content: space-between;"> _____ x _____ _____ x _____ </div> Score = _____
Total criteria weight (must = 10)		0	<div style="display: flex; justify-content: space-between;"> _____ _____ </div>

Enter a criteria from the list below or one of your own.

List the issue, problem, potential solution here to be evaluated

This automatically inserts the weight from the weighting column.

Enter the group's consensus ranking of how the criteria on this line impacts the issue. Rankings
 5=extreme impact
 4=very strong impact
 3 = strong impact
 2 = some impact
 1= no impact

This is the answer to weight x rank.

Enter the weight this criteria should have in comparison to the other 4 listed. Total of all the weighted criteria must = 10

Example of Completed Decision Matrix

The example is to reduce the number of trade permits that are placed on a hold status when received. Five criteria were identified with four solutions. The data showed most often applications were put on hold because of missing permit fees, so 'goof proofing' the application was the preferred solution.

Example Completed Decision Matrix

Criteria			simplify fees and forms			reject form			add instruction sheet			approval prior to fees		
1	Goof Proof	Criteria Weight	3	x	5	3	x	4	3	x	3	3	x	1
	for applicant	3	Score = 15			Score = 12			Score = 9			Score = 5		
2	Easy & Quick to Do	Criteria Weight	3	x	2	3	x	5	3	x	4	3	x	3
	for staff	3	Score = 6			Score = 15			Score = 12			Score = 9		
3	Improves customer satisfaction	Criteria Weight	2	x	4	2	x	1	2	x	4	2	x	1
		2	Score = 8			Score = 2			Score = 8			Score = 2		
4	Simplifies the process	Criteria Weight	1	x	5	1	x	3	1	x	2	1	x	1
		1	Score = 5			Score = 3			Score = 2			Score = 1		
5	Requires minimal resources	Criteria Weight	1	x	3	1	x	5	1	x	4	1	x	5
		1	Score = 3			Score = 5			Score = 4			Score = 5		
	for staff													
Total criteria weight (must = 10)		10	37			37			35			22		

STEP 3: Schedule a 5S exercise

5S is a Lean method to improve and sustain workplace organization and to maintain a visual workplace. The term 5S refers to the five stages of the cycle which all begin with the letter S in Japanese. In English, they are: Sort, Straighten, Shine, Standardize, and Sustain.

It improves how the operation appears to visitors- so your work area is always "tour ready". It also improves daily work functions for staff, making things easier to find for the direct user and indirect user while empowering everyone to be able to complete tasks outside of their direct responsibilities in the absence of a coworker. There is a place for everything and everything in its place.

Many companies have a standard that anything searched for must be able to be found within 30 to 60 seconds.

The 5S method is independent of analyzing problems; however, teams should discuss whether they think their project might benefit from a 5S exercise. This tool will become an routine method for the village to improve and sustain workplace organization.

Doing 5S

Choose an area or workstation that needs organizing. Take a picture of the area before you start and post it in the designated Lean project area display board which has been established by the PIR Communication & Recognition Team. When the project is complete, post after pictures in the area that was cleaned.

Step 1: Sort –Eliminate whatever is not needed, such as, equipment, tools, furniture, office items, safety hazards, supplies, etc. Remove the items to a designated area and red tag each item. Some items may be obsolete and thrown out - when in doubt move it out.

Step 2: Set in Order (straighten) – Make it obvious where things belong. A place for everything and everything in its place.

- ✓ Label locations or items- can use color coding for item location. For example, one file drawer can have different groups of colored files for different subjects.
- ✓ Place signs where needed- equipment related information or to show location, type, quantity, etc.
- ✓ Mark lines – mark lines for dividing spaces, creating outlines, directional or limits, such as for height. This is great for shared work areas.
- ✓ Have instructions available.
- ✓ Have permanent locations for things.
- ✓ Sort according to how often the items are used: daily, weekly, monthly.

No. : _____

5S RED TAG

Name: _____

Date: _____

Item/Description: _____

Location: _____

Qty: _____

CATEGORY

☐ Equipment or Tools

☐ Files

☐ Finished Goods

☐ Maintenance Supplies

☐ Office Equipment or Supplies

☐ Raw Materials

☐ Work-in-Process

☐ Unknown

☐ Other _____

Step 3: Shine (clean) – Clean everything, preventing dirt and contamination from reoccurring. This includes equipment as well. Remove outdated old materials. Replace torn binders and professionally label. Create a Shine check sheet that could be annually or more frequent depending on the area. The check sheet should describe cleaning schedule and maintenance tasks.

Step 4: Standardize (policies/ procedures) – Establish standards and guidelines and use pictures to show where things go. Know that all items can be located in less than one minute. Have all necessary and frequently used items visible.

Step 5: Sustain – Once an area is done and standards and guidelines written, it's essential to maintain the area. Create an audit list and assign routine reviews of the area. The list should be in the area in question, have an inspection schedule, and have an area for the signature of the

person inspecting. Weekly audits are great for workstations and monthly audits are great for supply areas. Findings from each audit should be reported to a department manager.

Examples of completed 5S



A cluttered office drawer is organized.



A pegged tool wall clearly marks locations for every tool by marking the shape of the tool on the wall so clearly visible when a tool is missing.



A facility maintenance storage area clearly labels and marks the physical space where each piece of equipment goes.





Before 5S



**After 5S - Cleaned,
organized and drawers
labeled (less time and
frustration hunting)**

This is an extreme example of how an office can look. Doing 5S in an office is the same as anywhere else. If a desk is ever shared, the location of the tape, stapler and calculator should be outlined with a thin piece of tape to indicate where all users should return them to when finished. All files that are not in immediate use should be elsewhere. You can create filing systems with different color folders to mean various things, such as, yellow folders are temporary projects and orange file folders are permanent.



Before



After

STEP 4: Complete an Action Planner form

Appendix M

The **Action Planner** identifies what the team still needs to do to fully implement the change. It identifies who needs to do it, the time it will take, how much it might cost and when it needs to be completed. Complete the form and give it to the Steering Committee. Your team should continue to meet to follow up on the last items.

Action Planner Template

Team:						
Action Needed	Who	Est Hours	Est Cost	Goal Date	Completion Date	Comments
1.						
2.						

STEP 5: Project presentation

Once the project is complete, present the project to the Steering Committee and others. A PowerPoint presentation should be kept to around five minutes and contains the following slides:

Title Slide: team name, date, project name from Team Charter, who is on the team and process owner

Slide: Current conditions, choosing from VSM, Data Collection, Flow Charts

Slide: Goals/Target Conditions

Slide: Root Cause Analysis- include Cause & Effect Diagram, 5 Whys or brainstorm results

Slide: Counter Measures – show Decision Matrix

Slide: Actions- who will do what and when, from Action Planner

Slide: Follow Up – list actions that will come after

Slide: List actual or estimated benefits of the project, such as, money or time saved

Slide: Each team member should list 1 -2 “lessons learned” by the team experience

Once the team is able to show that the solution has resulted in measurable improvement, then the team can move on to the Control Phase.

SECTION 6: CONTROL PHASE

The Control Phase is the fifth and final phase. This is the phase where you will see if the improvements that you have implemented are working. The focus of this phase is to make sure that the action item created in the Improve Phase is well-implemented and maintained. One of the main reasons for improvements not showing any sustainability is because this phase has been overlooked. Complacency can set in for the sake of bringing closure; however, this can result in the process reverting to the former performance levels and loss of some or all of the gains. Rigorous follow-up and corrective action with comprehensive yet simple documentation can increase the likelihood that the gains are sustained.

Control Actions: Once the improvements are identified, create a new process **Flowchart** and a **Control Plan** and update the **A3 Report**.

The Process Improvement Resource Documentation Team is able to assist with creating Standard Operating Procedures.

STEP 1: Standardize work

Once a new process is established, the team creates a new process **Flow Chart** and a **Standard Operating Procedure** (SOP) to standardize the work.

Revise the flowchart completed at the beginning of the project to reflect improvements. The changes should quickly show a reduction in steps.

Standard Operating Procedures should be on file for each departments common and uncommon processes and reviewed each to year to confirm consistency or if revisions are needed.

STEP 2: Create a Control Plan

A **Control Plan** is a written summary description of the system for controlling a process and describes actions required to maintain the desired state of the process, while minimizing process and product variation. It lists all product and process points and is essential for maintaining process control over the long run.

The Control Plan is completed by the team and used to foster an orderly transfer from the project team to the process owner in order to maintain the gain. The plan is monitored by a designated person who is involved in the process or close to the process.

There is a template for a **Control Plan Checklist** (Appendix N), but it can be modified and tailored for each project. Examples of basic control plan items should answer the following questions:

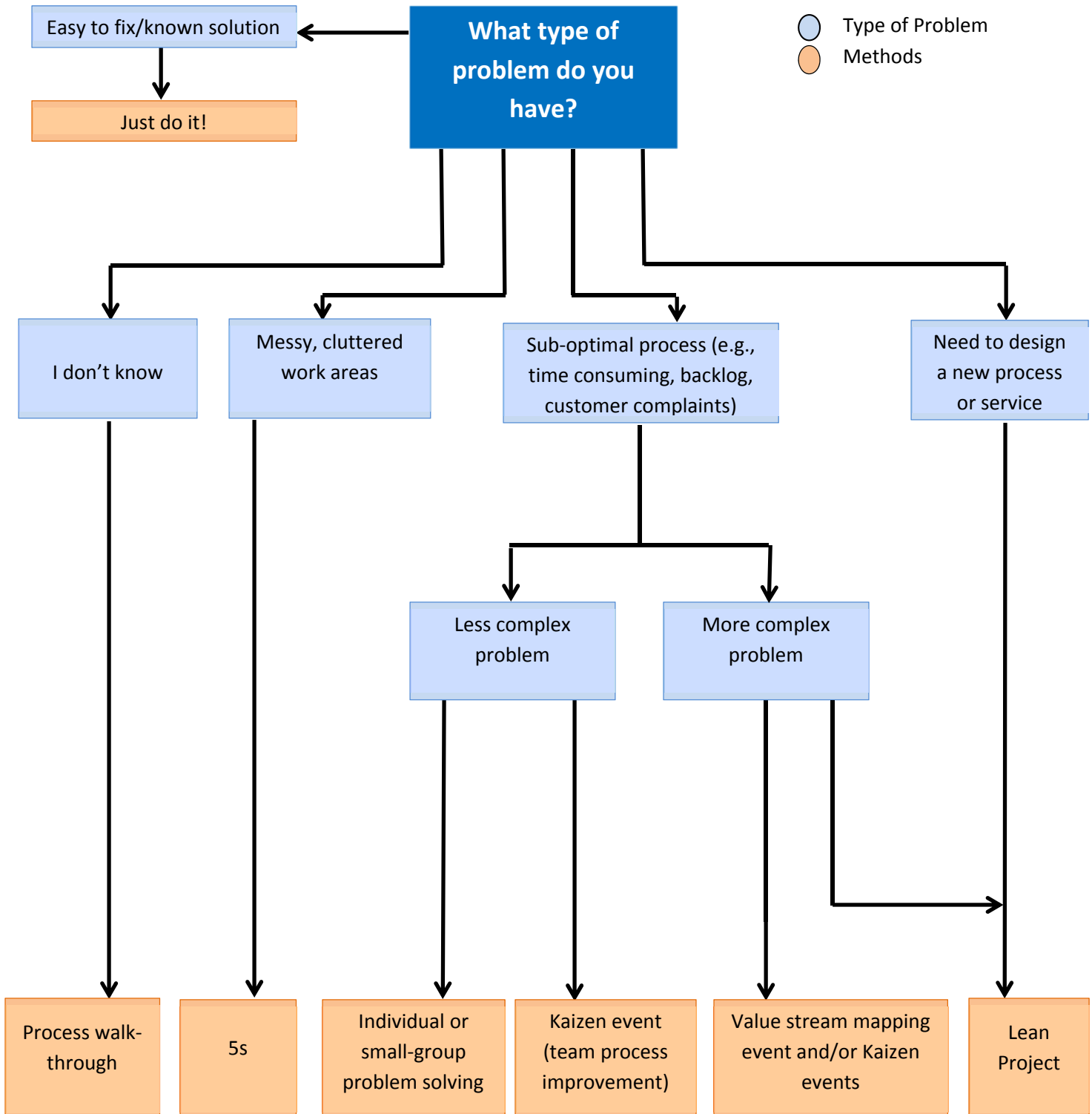
1. What do you want to control?
2. How often do you need to measure the process?
3. Do you have an effective measurement system?
4. Identify if any costs to monitor.
5. Who needs to see the data?
6. What type of tool or chart is necessary to monitor the process?
7. Who will generate the data?
8. Who will control the process? Have they been properly trained?
9. Are there any system requirements for auditing and maintaining the improvement?

The Control Plan should be visible and evaluated.

Lean Methods Decision Tree

Finding the Lean Method That's Right for Your Improvement Goals

The flowchart below illustrates how you might select a Lean method based on the type of problem.



Part II: Other Lean Methodologies

Lean and Six Sigma are just two of numerous approaches that are in use for systematically analyzing and improving process flow and efficiency within organizations. Other similar approaches and improvement techniques include Kaizen and PDCA. The selection of a particular process improvement approach will depend upon the specific circumstances and needs existing in a working environment, including the type of processes, the improvement objectives, skills, knowledge, and resources available.

Kaizen Concept

Kaizen is a process improvement concept. Kaizen, (Ky'zen) is a process of gradual, orderly, and continuous improvement. Kaizen is Japanese: "Kai" stands for change and "Zen" means good or for the better. Most often Kaizen is an event dedicated to process improvement and can take place over one day or up to a week.

There's also Kaizen moments, while going through any stage of the continuous improvement process, one will identify a "no-brainer" solution that can be implemented quickly. Completing 5S is an example of a Kaizen improvement on a smaller scale.

10 Tips for KAIZEN

- I. Discard conventional fixed ideas
- II. Think of how to do it, not why it cannot be done.
- III. Do not make excuses. Start by questioning current practices.
- IV. Do not seek perfection. Do it right away even if for only 50% of target.
- V. Correct it right away if you make a mistake.
- VI. Do not spend money for KAIZEN, use your wisdom.
- VII. Wisdom is brought out when faced with hardship.
- VIII. Ask "WHY?" five times and seek root causes.
- IX. Seek the wisdom of ten people rather than the knowledge of one.
- X. KAIZEN ideas are infinite.

PDCA Methodology

Another methodology used for process improvement is PDCA. It is a continuous loop of **P**lanning, **D**oing, **C**hecking or studying, and **A**cting. The model is ideal for continuous improvement and implementation of new projects or processes. It helps develop a newly improved process or service, can define repetitive work processes, and used when implementing any change.

The cycle entails checking the implemented changes for consistency before adopting it across the board. It allows breakdown of a project into small manageable steps and allows gradual incremental improvements.

Plan Identify the customer, what to change, and how to do it. Identify one important process. Conduct a walk-thru or talk-thru of the process: what's working and not working? Ensure the context and scope of the project is correct and appropriate. Look at current and future state and create an implementation plan. Know how to measure it.

Use **Flow Chart**, **Cause and Effect Diagram**, **Pareto Analysis**, or other tools to help identify where improvements are needed.

Do Quantify the current situation and execute the improvement. Discuss strengths and improvement opportunities in the process. Take periodic measurements of the process change as implementation progresses to ensure the changes are improving the process rather than creating new problems.

Check Ensure the improvement works. Analyze new data available and measure results to see if the implementation of the plan is giving the results that it should. Identify what's been learned.

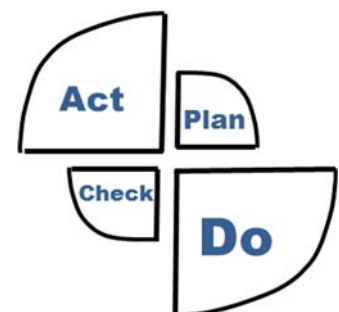
Data Checksheets and **charts** are appropriate tools.

Act Future and ongoing improvements. If implementation was successful, then **Standardize** and document the new process. If the change did not work, go through the cycle again with a different plan.



Imbalanced PDCA

The imbalanced diagram illustrates the predominant culture on where efforts are most often placed. Equal effort of each phase is important to the success of change and sustaining that change.



APPENDICES

A	Meeting Guidelines
B	Problem Statement form
C	SIPOC Diagram template
D	A3 Report template reference
E	Team Charter form
F	Data Collection Planner form
G	Data Collection Checksheet reference template
H	Value Stream Mapping symbols
I	Value Stream Mapping Process Step Table
J	Cause & Effect Diagram form
K	5 Whys form
L	Decision Matrix reference template
M	Action Planner form
N	Control Plan Checklist form

APPENDIX A:

Meeting Guidelines

A) General Meeting Guidelines.

- 1) Meetings are held only when necessary and effective to accomplish the objective.
- 2) Everyone 'checks their titles at the door' regardless of titles.
- 3) Appropriate people are notified as to who is in the meeting.
- 4) Meetings start on time.
- 5) Meetings are held with minimal interruption.
- 6) Meetings end on time

B) Participation in meetings.

- 1) No one or two people dominate the conversation.
- 2) Information required for discussion is proved in advance when expected so or is complete when necessary to bring to the meeting.
- 3) People are 'present' in the current meeting, one person talks at a time.
- 4) People are treated with respect. What happens in the meeting, stays in the meeting.
- 5) Discussion is kept on task and on time.
- 6) Assignments are given and accepted where appropriate with the expectation of being completed when agreed upon or the appropriate people are notified well in advance (as soon as realized) of a due date that the due date will be missed.
- 7) A question of whether anyone else has input should be asked at the end of the meeting.

C) Decision making

- 1) Data is expected to be presented for decision making. 'In God we trust, all others must bring data.'
- 2) The team defers a decision to the most appropriate team member.
- 3) When appropriate, the three C's of decision making employed (Command decisions, Consensus decisions, and Consultative decisions) with 'consultative' being most used.
- 4) Meetings should employ decision making tools when appropriate.

I have read the above Meeting Guidelines and agree to abide by them to the best of my ability. I also agree that I will graciously accept feedback from my co-participants (especially the Team Leader / Facilitator) if I am not following the guidelines.

NAME

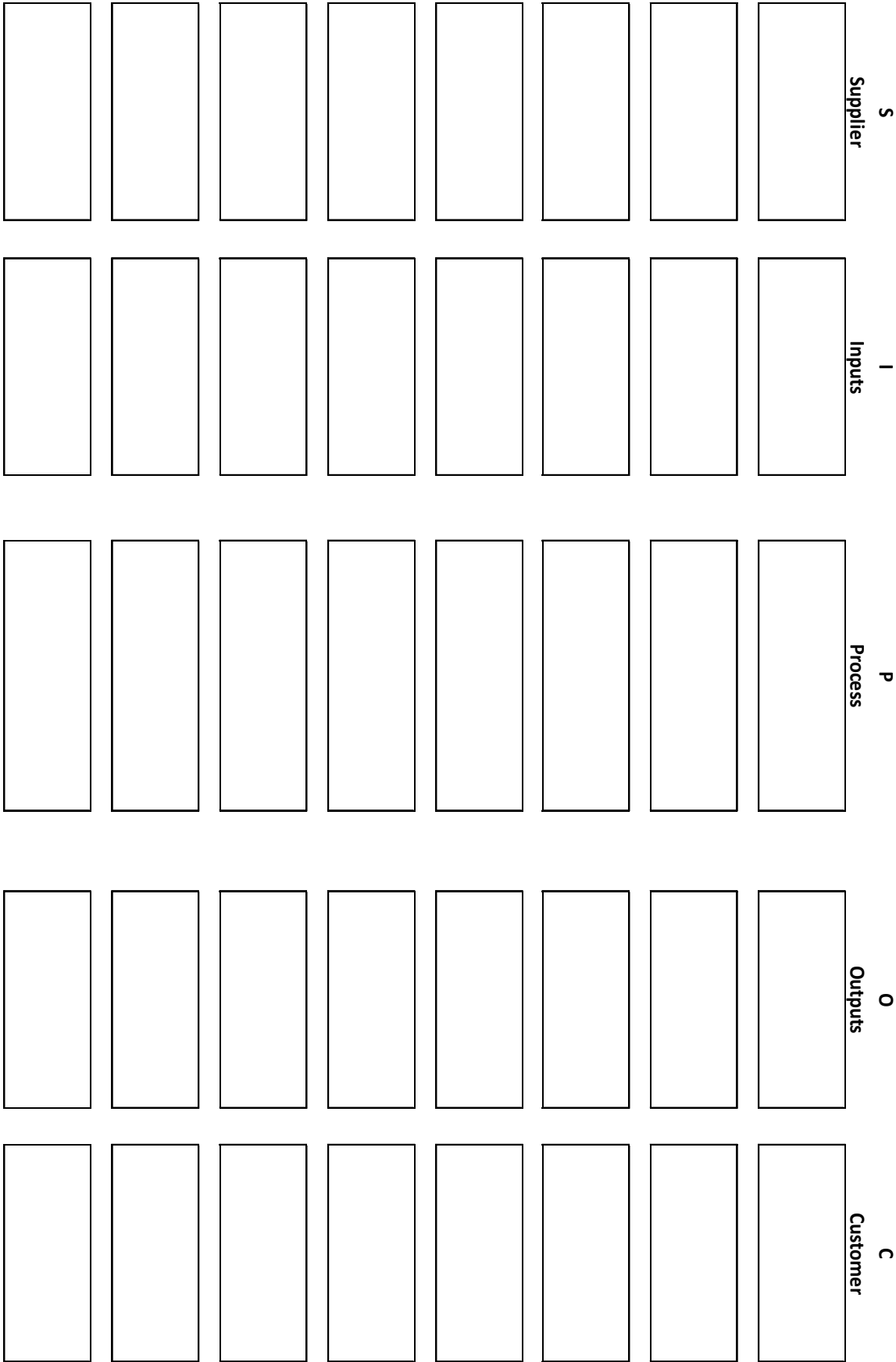
DATE

APPENDIX B:**Problem Statement Worksheet**

ELEMENTS OF THE PROBLEM STATEMENT MUST INCLUDE:	
<i>Do NOT include: stating opinions of what is wrong; suspected causes of problem; anticipated solutions; assign blame; having more than 1 problem statement.</i>	
Write a few sentences that describe the problem. Just list the problem.	
Are there subsets of the problem to focus on	
What is NOT to be included in the problem	
Do not include suspected causes or any suggestions for solution.	
What is the impact/loss to the organization? Why and to what degree is a problem causing (i.e. poor customer satisfaction, dollars lost, time lost, stress on employees, etc.) ?. Use data if at all possible.	
What is the current measurement of the problem (i.e. KPOV baseline measure) usually measured the requirements failed to be met, units, defective rate, money, time or a combination. Use data if at all possible.	
When and how does the problem show itself	
Problem Statement	

APPENDIX C:

SIPOC DIAGRAM



APPENDIX D:**A3 REPORT**

The report is saved in the Staff Intranet in an A3 (11" x 17") format.

Title	Owner	Date
Background	Counter Measure Proposal(s)	
Current Conditions		
Goals/Target Condition	Who	Action
Root Cause Analysis		When
	Follow Up	

APPENDIX E:
TEAM PROJECT CHARTER

Name of the project:

Project definition (what is it that the team wants to accomplish):

Who Is On The Team

Name	Role (if any)*

How often will the team meet?

How long will team meetings be?

People (other than team members) who will get the team's meeting minutes and other communications:

What will be improved?	What is the current measure?	How is it measured?	What is the desired goal?

What are the lean strategies that might be used?

_____ Map the process and identify waste	_____ Workplace organization
_____ Mistake proof	_____ Workload balancing
_____ Kaizen (Continuous improvement over weeks/months)	_____ Kaizen event(s) (Improvements done in 3-5 days w/ everyone working FT on improvements)
_____ Standardized work (Identify best practices and all do the same way)	_____ Continuous flow (start it – finish it), cellular office layout
_____ Visual management (guides, displays, how-to's)	_____ Other

Sign-offs:

Manager's sign-off:

Comments:

APPENDIX F: DATA COLLECTION PLANNER

Key Process Indicators (KPIs) would be data that indicates how a particular process is working. The measurement is often stated in terms of how often (especially what percentage went wrong), how much money was lost, how long did it take to fix the problem, etc.

For example, the measure accurately entering orders into a computer system might be:

1. How many times did someone have to get clarification on an order because the order information was not complete, accurate, or timely?
2. How many orders were shipped in error because of wrong information on the order?

Another example, when an error occurred:

1. How many times did an error occur?
2. When an error occurred, what is the suspected or known cause of the error?
3. How much money was lost due to errors?

What is the process?

KPI #1

What is being measured?

How is the issue being measured?

Who is responsible to be sure data is collected and is good data?

Start date:

Stop date:

How will data be graphically displayed/communicated?

KPI #2

What is being measured?

How is the issue being measured?

Who is responsible to be sure data is collected and is good data?

Start date:

Stop date:

How will data be graphically displayed/communicated?

KPI #3

What is being measured?

How is the issue being measured?

Who is responsible to be sure data is collected and is good data?

Start date:

Stop date:

How will data be graphically displayed/communicated?

APPENDIX G:

DATA COLLECTION CHECKSHEET

Checksheet For _____

Week Of _____ Shift / Department _____

Ranges	Time or Money Lost									Total
	X to X	X to X	X to X	X to X	X to X	X to X	X to X	X to X	X to X	
Issue # 1										
Issue # 2										
Issue # 3										
Issue # 4										
Issue # 5										
Issue # 6										
Issue # 7										
Issue # 8										
Issue # 9										
Issue # 10										
Other *										

Data Box

Data Box



Go See

Data Box

Data Box



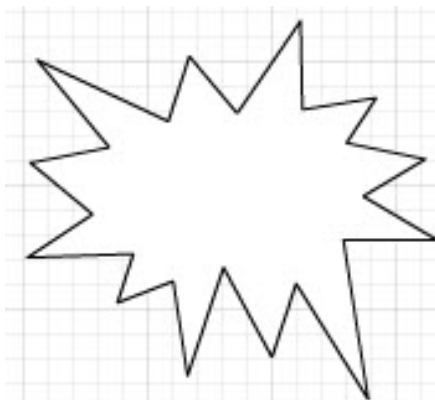
Go See

Data Box

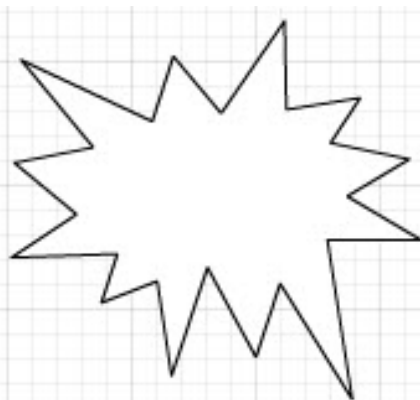
Data Box



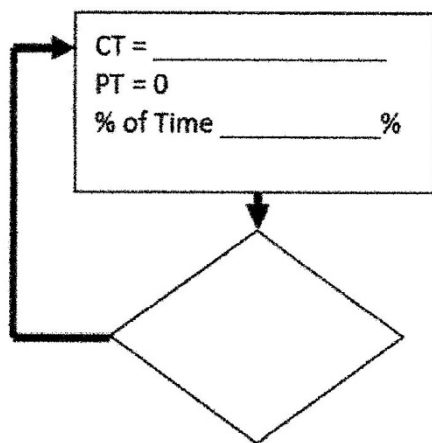
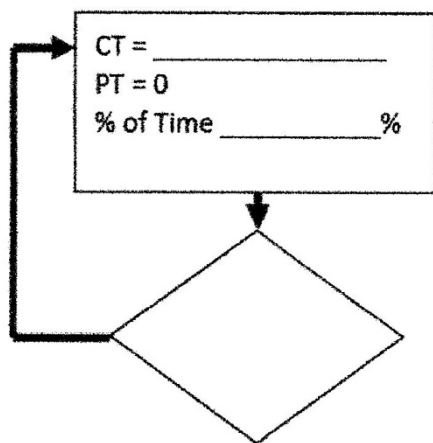
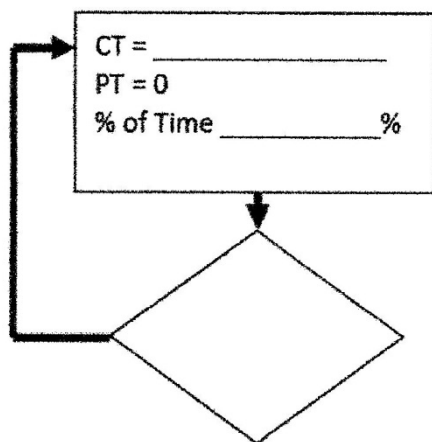
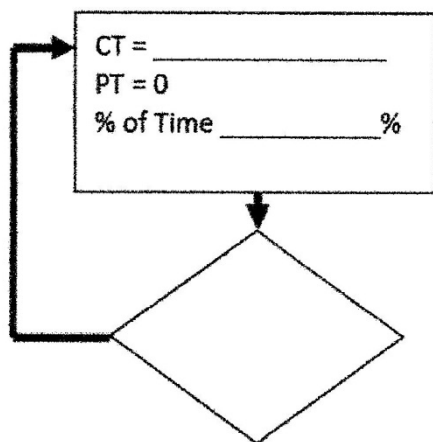
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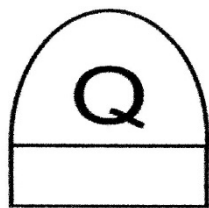


Kaizen Burst

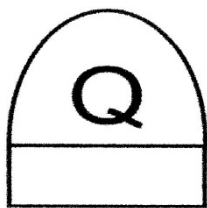


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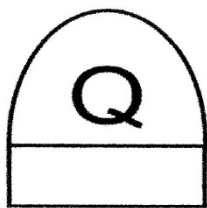




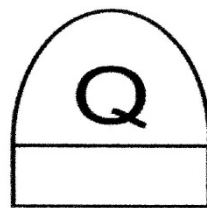
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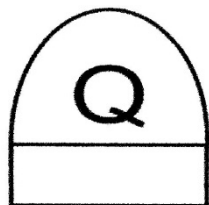
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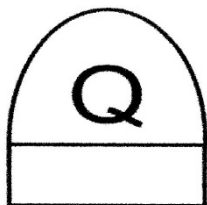
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Que



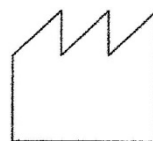
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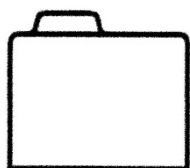
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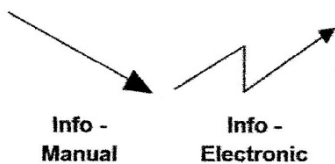
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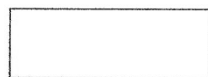
Customer or Supplier



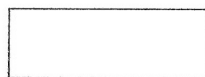
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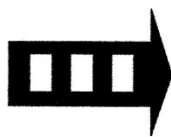
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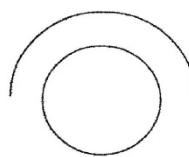
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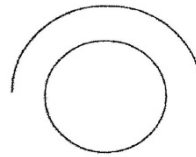
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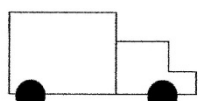
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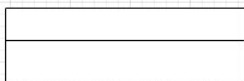
Worker / Clerk /
Rep



Worker / Clerk /
Rep



Truck Shipment



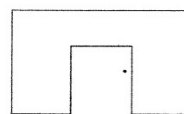
Process - Dedicated



Process - Shared



Withdrawal



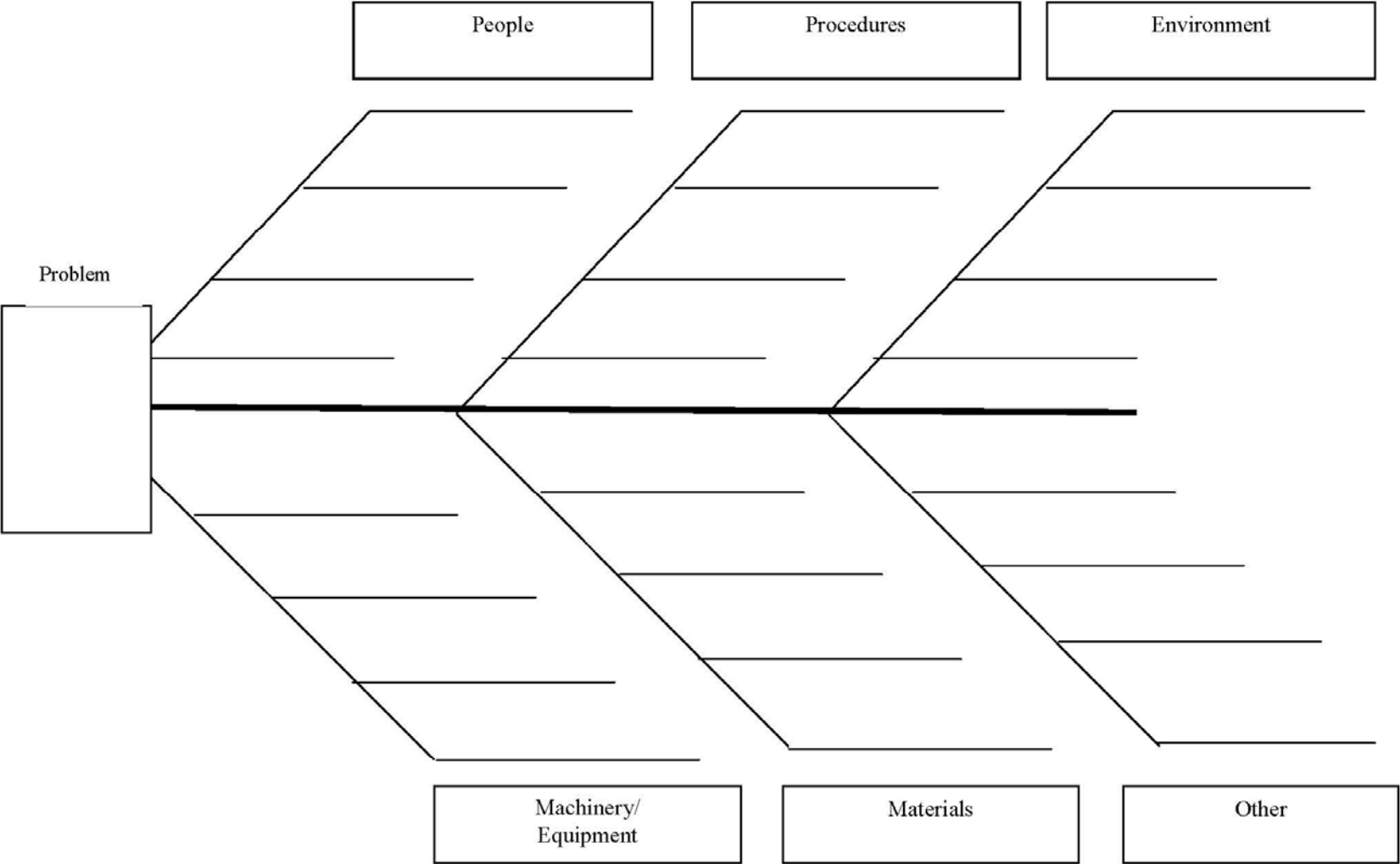
Work Cell

APPENDIX I: VALUE STREAM MAP PROCESS STEPS

Process Steps	CT	ET	NVA ✓	Process Steps	CT	ET	NVA ✓
Totals				Totals			
Quality:				Quality:			
Available Time				Available Time			
Demand				Demand			
Process Steps	CT	ET	NVA ✓	Process Steps	CT	ET	NVA ✓
Totals				Totals			
Quality:				Quality:			
Available Time				Available Time			
Demand				Demand			

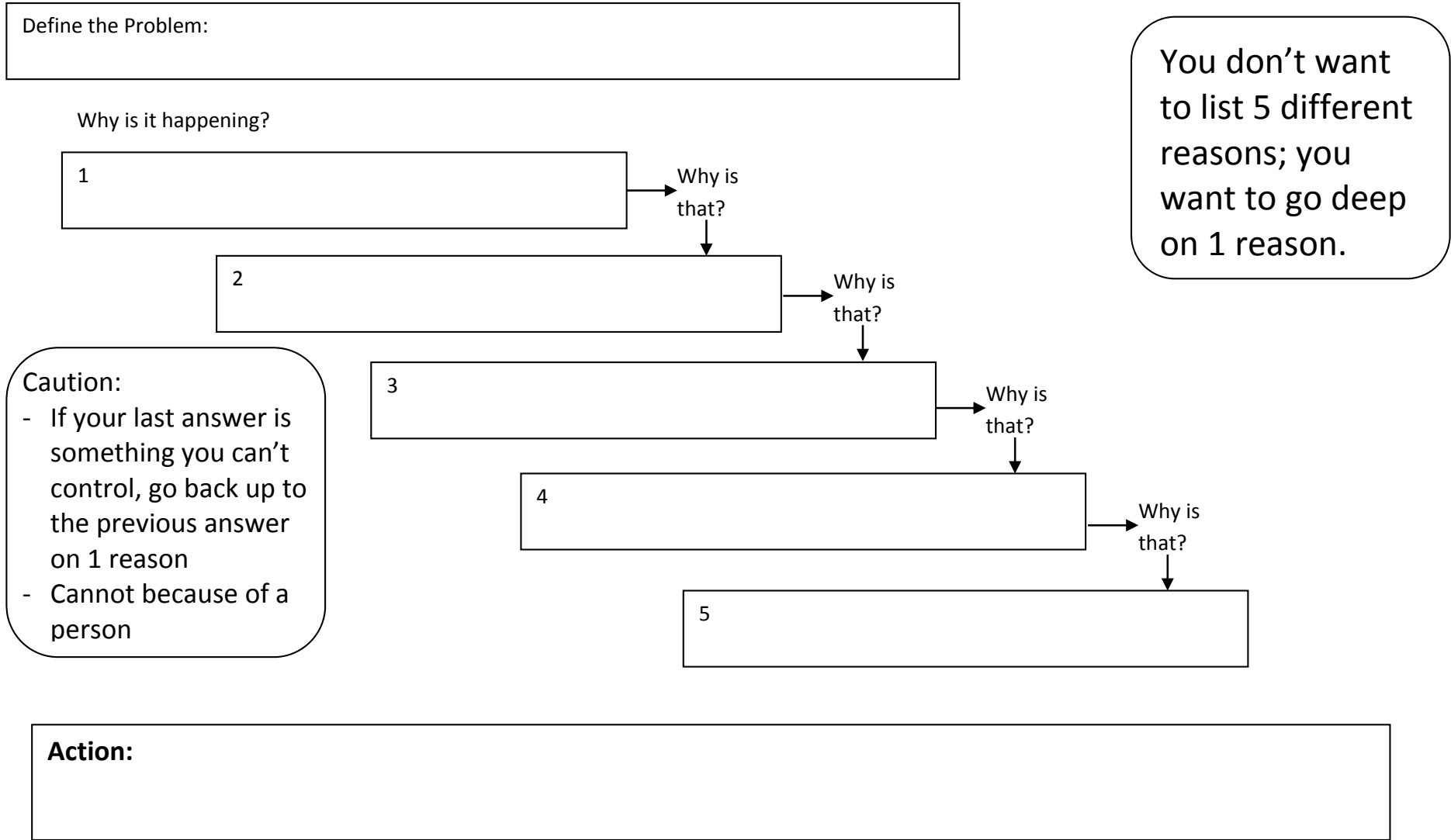
APPENDIX J:

CAUSE & EFFECT DIAGRAM



APPENDIX L:

5 WHYS



APPENDIX L: DECISION MATRIX

Refer to the Staff Intranet to use the Excel Decision Matrix Worksheet

Team and Members Performing Analysis:
Problem Or Issue Under Study:
Date Performed:

↓ Criteria		Solutions or Ideas To Be Evaluated →				
1						
	Criteria Weight	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____
2	Criteria Weight	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____
3	Criteria Weight	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____
4	Criteria Weight	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____
5	Criteria Weight	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____	____ x ____ Score = ____
Total criteria weight (must = 10)	____	____	____	____	____	____
Note: If something less than the issue with the highest points needs to be selected, state reasons below.						
Potential Criteria	Improves quality	Improves customer satisfaction	Saves big \$\$	Easy to do	Quick to do	
	Requires minimal resources	Simplifies the process	"Goof proofs" the process	Reduces stress	Improves quality of work life	

Note: See instructions (embedded as a comment) in the first criteria, weight, and ranking cells.

Main Goal

Action Needed	By Who	Est Hrs	Est Cost	Goal Date	Compl. Date	Comments

APPENDIX M: CONTROL PLAN CHECKLIST

1. Revise the process map/ procedures/ documentation to reflect the changes.
2. What measurements will continue? Decide if constant or off-and-on measurements.
3. How will the process trigger an action alarm if worsens, or even improved more?

4. Who is the “Process Owner” who must monitor, sustain and even gain more improvement?

5. To who will they report to? _____ How often? _____

6. How long will the measurements, auditing and check-ins stay in place? _____

7. Revisit original problem statement. Is the problem fixed? Explain why or why not.

8. Explain how the process has been improved and the estimated annual savings below.

9. Have you evaluated how the new process might be made “goof proof”?
10. If gains have been lost, the problem must be investigated as to why and fixed.
11. Plan a wrap-up & celebration meeting with the team and management.
12. The team decides whether to meet in 30/60/90 days to make sure gains are sustained.

