Unit 4

Step 4: Improve

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Step 4: Improve

Objective:

Develop and implement Improve to eliminate the verified root causes of the problem.

Description:

In STEP 4, Improve should be **selected** that act as immediate remedies to the root causes of the problem **and** that actually eliminate the root causes. Although immediate remedies are vital, always provide for a prevention of the recurrence of the root cause of a problem. The Improve must not only **effectively** close the problem gap, but they should be **feasible** and not cause other problems. The **action plan** to implement the Improve should consider contingencies and include sufficient detail to answer the questions – what, how, who and when?

Checkpoints:

Improve were selected to address verified root causes.

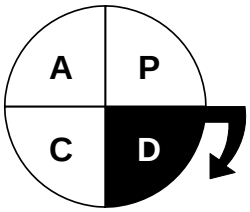
Actions should be taken to cure the problem (immediate remedy) and also to eliminate the recurrence of the root causes, thus preventing recurrence of the problem. In addition, care should be taken to prevent other problems from occurring as Improve are implemented. An Improvement Matrix may be initiated in this checkpoint.

Step 4: Improve (Continued)

14 ✓ **The method for selecting the appropriate Improvement was clear and considered effectiveness and feasibility.**

The Improve proposed should be rated as to their effectiveness in closing the problem gap. They should also be rated as to feasibility. A Improvement Matrix can allow one to combine both ratings. Multiplying the effectiveness and feasibility ratings together can then complete the Improvement Matrix. The Improve with the highest total scores should be considered for implementation.

15 ✓ **Barriers and aids were determined for counter-measures worth implementing.**



Existing forces pushing for (aids) and against (barriers) the implementing of the Improvement should be assessed. This will help in the development of contingencies and ensure the action plan is realistic and has a higher probability of success.

16 ✓ **The action plan reflected accountability and schedule.**

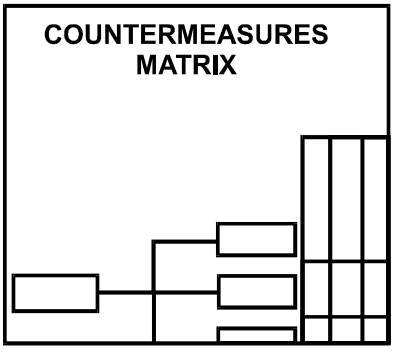
The action plan needs to be as specific, realistic, and as thorough as possible. Individual names should appear in the action plan instead of departments or groups whenever possible. This will enhance accountability and the probability of success. The schedule should coincide with dates established for achieving the target in STEP 2.

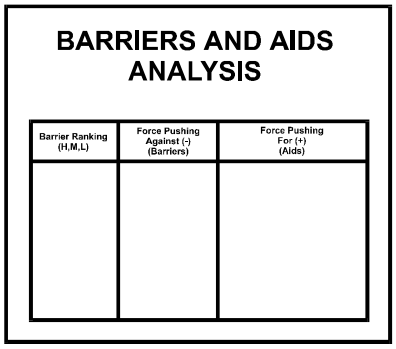
Step 4: Improve (Continued)

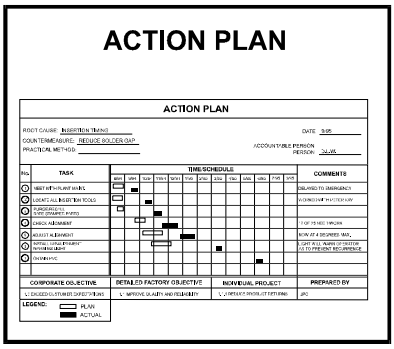
Recommended Tools and Techniques:

Techniques that may be helpful include:

- Improvement Matrix
- Barriers and Aids
- Action Plan
- Cost-Benefit Analysis
- Process Flowchart(s) (before and after Improve)
- Brainstorming
- Multivoting
- Creative Thinking Technique
- Breakthrough Thinking Techniques
- Re-engineering Concepts







Improvement Matrix (Technique)

Sometimes those who have been involved in Quality Improvement talk as though the solution "falls out automatically" at the end of the process. There are occasions on which only one solution is possible (build or not build, buy or not buy), but these are rare. As much care should be taken in choosing a solution, or countermeasure, as at any other stage of the process. The team should work from its collected information, research options, be as creative as the issue will allow, and be diligent in the pursuit of not just an adequate answer but the most appropriate answer.

Some possible Improvements will be obvious. Brainstorming, creative thinking, breakthrough thinking, interviewing, and management suggestion are all good sources of potential countermeasures. Once the most likely Improvements have been chosen, they should be investigated. What will they involve, how many people and how much money and time?

What Is A Improvement Matrix?

A **Improvement Matrix** is a matrix of factors to help the team show the relationship between the problem, root causes, and Countermeasures. It also helps the team to evaluate which Improvements should be implemented.

Improvement Matrix (Technique)

Why Is The Improvement Matrix Useful?

It is used to ensure that the Improvements address the verified root causes. This matrix guides the team in determining the effectiveness and feasibility of the potential Improve. Other prioritization matrices may be used to evaluate Improve, but teams can easily use this one.

How to Create a Improvement Matrix

1. **Utilizing an Improvement Matrix (see Forms, Unit 7), complete the first two columns of the matrix** ("Problem Statement" and "Verified Root Causes").

2. **Identify Improve that address each of the verified root causes** and enter them in the appropriate "Countermeasures" boxes.

3. **Rate each of the Improve numerically for effectiveness and feasibility.** The higher ratings go to those Improvements that are more effective and more feasible.

4. **Multiply the rating's for each countermeasure** and record the overall rating in the appropriate box.

Improvement Matrix (Technique) (Continued)

5. **Determine the number of Improve that should be implemented.** The team will need to consider its resources and its target for improvement. A sufficient number of Countermeasures needed to be implemented to achieve the target established in STEP-2.

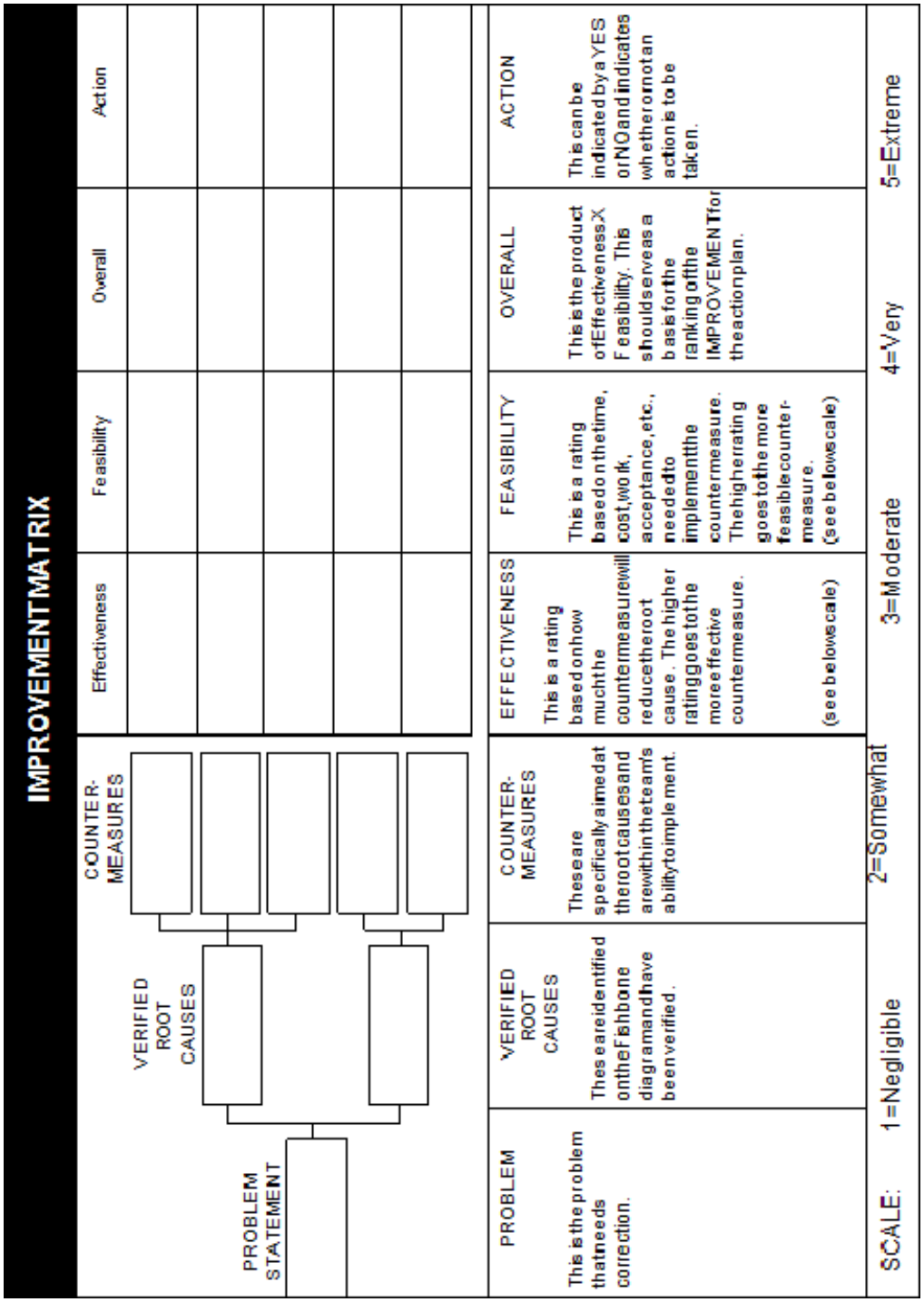
6. **Indicate whether or not the countermeasure is to be implemented** by writing either "yes" or "no" in the action column.

Tip

When Should You Use The Improvement Matrix?

It is used after the team has identified possible Countermeasures that will address the verified root cause(s).

Improvement Matrix (Technique) (Continued)



IMPROVEMENT MATRIX

PROBLEM STATEMENT

VERIFIED ROOT CAUSES

COUNTER-MEASURES

	Effectiveness	Feasibility	Overall	Action

PROBLEM	VERIFIED ROOT CAUSES	COUNTER-MEASURES	EFFECTIVENESS	FEASIBILITY	OVERALL	ACTION
This is the problem that needs correction.	These are identified on the Fishbone diagram and have been verified.	These are specifically aimed at the root causes and are within the team's ability to implement.	This is a rating based on how much the countermeasure will reduce the root cause. The higher rating goes to the more effective countermeasure. (see below scale)	This is a rating based on the time, cost, work, acceptance, etc., needed to implement the countermeasure. The higher rating goes to the more feasible counter-measure. (see below scale)	This is the product of Effectiveness X Feasibility. This should serve as a basis for the ranking of the IMPROVEMENT for the action plan.	This can be indicated by a YES or NO and indicates whether or not an action is to be taken.

SCALE: 1=Negligible 2=Somewhat 3=Moderate 4=Very 5=Extreme

Cost-Benefit Analysis (Technique)

The cost of implementing a countermeasure should always be weighed against its benefits. **Cost-Benefit Analysis** is used to compare the costs and benefits (in dollars) of a plan. It is used to estimate financial impact. It helps in choosing a plan that will give the most benefits for the least cost. As part of the **DMAIC Story** process, a Cost-Benefit Analysis allows you to compare one proposed countermeasure with another. This will provide you with valuable information, but it does not make decisions for you. It is desirable for benefits to be greater than costs, but the difference will vary from one situation to another. In fact, even if you spend more than you save, the results in terms of quality, safety, morale, or decreased job frustration can be worth it. A Cost-Benefit Analysis is another important technique for helping teams make decisions about the feasibility of the Improve.

Example:

COST - BENEFIT WORKSHEET			
TYPES OF COST	**VALUE**	**TYPES OF BENEFITS**	**VALUE**
New Software	$1,800	Less Labor Hours	$8,000
Training	$1,900	Less Errors	$350
Other Materials	$425	Happier Customer	—
TOTAL COST	$4,125	**TOTAL BENEFITS**	$8,350
COST - BENFIT RATIO =		$\frac{\text{BENEFITS}}{\text{COST}}$ = DECISION	

How to Conduct a Cost-Benefit Analysis

1. **Determine the time period to which your analysis will apply.** (In many cases, costs and benefits are calculated over a period of one year. More complex projects may be based on 1-15 year time horizons.)

2. **Brainstorm a list of the cost factors,** both obvious and less obvious, related to the practical method. Examples of less obvious cost factors are overtime, training, maintenance, safety, inventory, and scrap.

3. **Determine the cost associated with each factor.** You may have to estimate these costs. Subject matter experts may provide insight to cost factors.

4. **Determine the total cost for the countermeasure.**

5. **Brainstorm a list of the benefit factors,** both obvious and less obvious, related to the countermeasure. Examples of less obvious benefits are: less overtime, less training, less maintenance, less scrap, safer operation, lower inventory, better customer satisfaction, and cleaner work area.

6. **Determine the value (savings or avoided costs) associated with each benefit.**

7. **Add the total financial benefits of the countermeasure.**

8. **Divide the value of the total benefits by the total costs** to determine the ratio of benefits to costs. (Item #7 ÷ Item #4.)

9. **Analyze and discuss the total cost-benefits** and reach consensus on your decision as to whether the Improve are feasible.

Barriers and Aids Analysis (Technique)

Barriers and Aids Analysis is a technique that is used to identify elements that impede **(barriers)** or facilitate **(aids)** the implementation of the countermeasure(s).

Barriers and Aids Analysis helps teams to carefully analyze a situation when they are planning for the implementation of the countermeasure(s). Once barriers and aids are identified, the team can make plans to use the available aids and/or to overcome the barriers that can prevent effective implementation of the countermeasure(s).

How to Perform a Barriers and Aids Analysis

1. **Identify the countermeasure(s).**

2. **Identify (through brainstorming) possible barriers** to implementing the countermeasure(s) and put them in a list.

3. **Identify and list likely aids that exist today** and could facilitate implementation of the countermeasure(s).

4. **Rank all listed barriers** as high, medium, or low.

5. **Match aids which balance or overcome barriers.**
   (Note: it is not necessary to come up with an aid for every barrier.)

6. **Identify items needing team action** using your rankings (high, medium, low).

7. **Incorporate the aids into the implementation action plan** to overcome the high, and possibly medium, ranked barriers.

Tip

After a team has identified the most appropriate Improve, it can use Barriers and Aids Analysis to assist in identifying elements needing to be addressed in implementation Action Plan. The Barriers and Aids Analysis is used prior to developing the Action Plan.

BARRIERS AND AIDS ANALYSIS		
Countermeasure:_____		
Impact **H = High** **M = Medium** **L = Low**	**Forces Pushing Against (-) (Barriers)**	**Forces Pushing For (+) (Aids)**
▪ What could prevent the successful implementation? ▪ If after a year the implementation failed… what could have been a likely reason?		▪ What force, method, element, or entity exists today that could assist in implementation?

Action Plan (Technique)

An **Action Plan** is an outline of who will do what, when, and by what methods. It ensures that nothing is left to chance as you set out to implement a new way of doing things. An action plan encourages you to think in a systematic and comprehensive way about all the activities necessary to begin implementing the team's Improve.

Action Plan Example:

ACTION PLAN

Legend: ☐ = Proposed ■ = Actual

What (To Accomplish)_____

How	Who	When

How to Create an Action Plan

1. **Discuss and come to agreement on the following:**
   - What needs to be done (specific tasks, arrangements, for example)?
   - When does it need to be finished?
   - Who will do it?
   - How will it be done?
   - What resources are needed (materials, equipment, and expertise)?
   - Are there any special considerations (approvals needed, other departments affected)?

2. **Record all agreements and completion dates** on the Action Plan Worksheet.

3. **Review the plan on a timely basis and update as needed.**

The Barriers and Aids Analysis is one source for steps to include in the Action Plan. The plan is a living document and should be reviewed frequently.

Tip

Items to consider when developing an action plan:

1. *Analyze the proposed countermeasure or practical method (project) and break it down into steps (activities or tasks) required to accomplish it.*

2. *When describing the task, make sure it is at the task level. If the task is complex and could really qualify as a project, make sure a secondary action plan is created for that project that specifies all the tasks required for completion.*

3. *Consider all resources needed: people, equipment, time, and training.*

Management Presentation

A. **What is a Management Presentation?**

A Management Presentation is an opportunity for the team to describe its **DMAIC Story** to management in order to solicit understanding, support and approval.

B. **Why is it useful?**

Aside from gaining approval for implementation of Improve, the management presentation is a golden opportunity for the team to personally experience, as a whole, all that it has done, and to gain recognition for its activities and accomplishments.

C. **How is it done?**

In the **DMAIC Story**, be sure that: 1) the problem is clearly stated on the cover page, 2) all words and graphs are legible, 3) all terms are defined, and 4) the checkpoints are all satisfied.

The team briefly recounts its use of the process. The data gathered are illustrated using the **DMAIC Story** format. The team organizes its presentation to show the logic, flow and consistency of the project. Teams need to consult the **DMAIC Story Review Form** to ensure that each checkpoint is addressed. Once this is complete, the team prepares and rehearses its presentation, incorporating effective presentation and communication skills.

D. **When is it used?**

This depends upon the department or area. However, a rule of thumb is for the teams to make a management presentation at STEPS 2, 4 and 5 of the **DMAIC Story**. The presentation at STEP 2 is to assure that the team has stratified the data and focused properly to avoid working on "world hunger." The STEP 4 review is to secure the approval to implement the Improvements usually in a test area. After

Step 5, it is time to review the effects (results) and standardization and to **celebrate** success by recognizing the team.

Reviewing DMAIC Stories

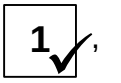
The method of learning to use logic and techniques to tell the **DMAIC Story** is to practice reviewing and critiquing examples.

When preparing a **DMAIC Story** or when reviewing a **DMAIC Story**, especially when you may not be familiar with the technical content, look at three areas:

Logic + Flow + Consistency = Effective DMAIC Story

Logic

Ask questions relating to *content*.

- "Does the story make sense?"
- "Does it follow process and use **QC tools** or techniques correctly?"
- "Are the checkpoints of the **DMAIC Story Review Form** met partially, fully or not at all?" (Checkpoint compliance can be illustrated by showing 

, 

,etc. on the **DMAIC Story** itself.)

Flow

Check the *format* to see if the **DMAIC Story** is easy to read, follow and understand.

- "Are there *links* relating the process steps, objectives and checkpoints?"
  - An opening telling why an investigation is being performed.
  - A graphic display of data with a meaningful title.
  - A summary of the data highlighted, such as "findings."
  - Finally, objective conclusion(s) turning the data into useful information and leading to the next question or process step.

- "Are linking mechanisms used to help the flow and keep the reader's eyes focused on important points?"
  - **DMAIC Story** layout with headings
  - Arrows (to indicate logical transitions)
  - Clouds (to indicate areas of emphasis)
  - Hash marks
  - Page numbers, etc.

Consistency

Look for agreement or harmony in both content and format, relating each process to one another and to the overall **DMAIC Story**.

- Terminology
  Example: Purchasing Form, Requisition, Order, Purchase Order
  If these are meant to be one and the same, then the same term should be repeated.
- Drawing of graphs, charts, matrixes, etc.

Recognition

A. Purpose

The purpose of recognition is to formally acknowledge the accomplishments of teams or team related activities.

B. Aspects of Recognition

Two major forces help drive Quality Improvement. These are:

- Personal satisfaction from participation in the process and the knowledge that you can make constructive changes in your work environment, which help meet the needs of the customer.
- External recognition, which honors those who contribute to quality improvement.

C. Considerations

Recognition is meant to be a "Win-Win" situation, but it is often difficult to implement in a way that everyone perceives it as such. *Teams should recognize that successful long-term recognition is most applicable on a local level.* Peer recognition and recognition by your local management have a more direct, lasting impact.

D. Basic Rules

- Sincere
  - Tone of voice is consistent with verbal message being conveyed.
- Personalized
  - Meaningful personal interaction between the giver and receiver.
- Accurate
  - Giving credit where credit is due.
- Timely
  - Effective recognition follows its target behavior closely in time.

Recognition (Continued)

- Specific
  - Provide information on the particular aspects of performance that made it outstanding and deserving of recognition.
- Situationally Appropriate
  - Giver is consistent in her/his interpersonal style.
  - Form of recognition is suitable for the occasion and the recipient.

E. Types of Recognition

- Tangible versus intangible recognition.
  - What is the magnitude of the accomplishment? (Tangible is more suitable for "larger" accomplishments.)
  - What is valued by the receiver? Would the recognition have a greater impact in a tangible form or would intangible means, such as increased responsibility, be more suitable?
- Formal versus informal recognition.
  - What is the magnitude of the accomplishment?
  - What is the availability of formal channels, (i.e., scheduled recognition event or award dinner)?
- Public versus private recognition.
  - Giver's comfort level.
  - Receiver's comfort level.
  - Peer environment.

Public recognition is a vehicle for making the organization more effective by calling others' attention to those behaviors and attitudes that are making positive contributions. Thus, a decision to recognize publicly is based on the expectation that there is increased motivational value to both the receiver and the audience.