Fundamentals of Total Quality Leadership

Module 5: Basic Process Improvement Tools

Student Information

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Student Information (continued)

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Student Information (continued)

Lesson Objectives

By the end of this module the student will be able to:

EO 5-1 Explain the purpose and uses of process improvement tools.
EO 5-2 Construct and apply Flowcharting, Brainstorming, Affinity Diagrams, Cause and Effect Diagrams, Nominal Group Technique (NGT), Multivoting, Check Sheets, Pareto Charts, and Run Charts.
EO 5-3 Describe Histograms and Control Charts.
EO 5-4 Describe the importance of a Data Collection Plan.
EO 5-5 Complete an exercise using the basic process improvement tools.

Length of Instruction

This lesson takes approximately 6.0 hours

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Fundamentals of Total Quality Leadership

Module 5

Basic Process Improvement Tools

Module 5 Viewgraph 2

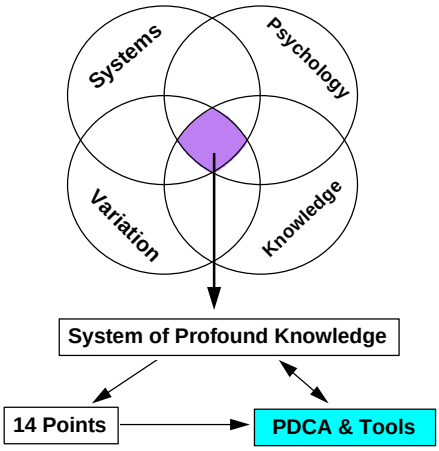
Learning Objectives

By the end of this module the student will be able to:

- **Explain the purpose and uses of basic process improvement tools**
- **Construct and apply Flowcharting, Brainstorming, Affinity Diagrams, Cause and Effect Diagrams, Nominal Group Technique (NGT), Multivoting, Check Sheets, Pareto Charts, and Run Charts**
- **Describe Histograms and Control Charts**
- **Describe the importance of a Data Collection Plan**
- **Complete an exercise using the basic process improvement tools**

Module 5 Viewgraph 3

DON Approach to Quality Management



Module 5 Viewgraph 4

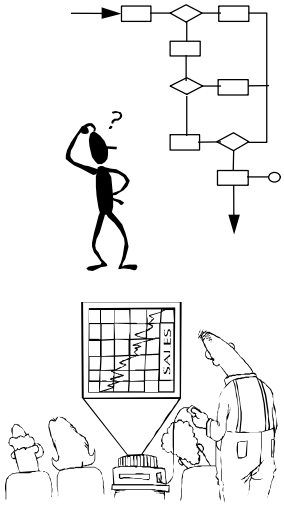
Basic Tools for Process Improvement

- Flowcharting
- Brainstorming
- Affinity Diagram
- Cause and Effect Diagram
- Nominal Group Technique (NGT)
- Multivoting
- Check Sheet
- Pareto Chart
- Histogram
- Run Chart
- Control Chart
- Data Collection Plan

Module 5 Viewgraph 5

Purpose of Tools

- Describe and improve processes
- Evaluate process or output variation
- Assist with decision-making
- Analyze data in a variety of ways
- Display information



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Flowchart

A diagram that uses graphic symbols to depict the nature and flow of the steps in a process

Benefits of Using Flowcharts

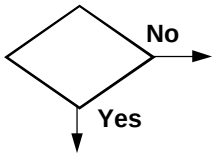
- Promotes understanding of a process
- Identifies problem areas and opportunities for process improvement
- Provides a way of training employees
- Depicts customer-supplier relationships

Symbols Used in Flowcharts

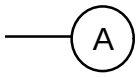
Start / End

Process Step

Decision

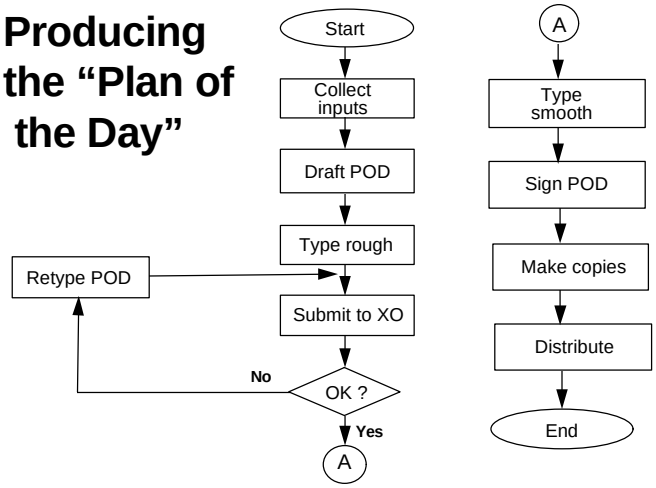


Connector



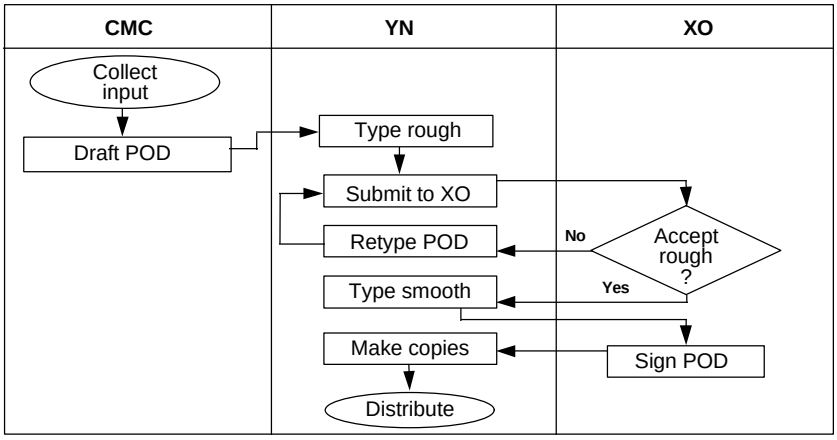
Linear Flowchart Example

Producing the "Plan of the Day"

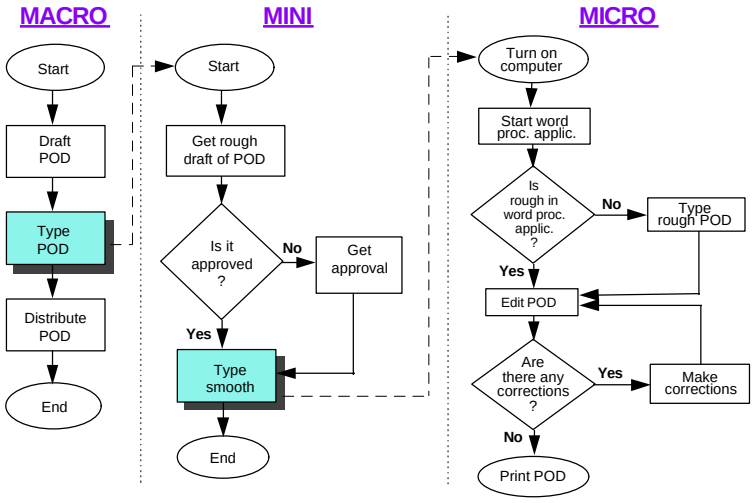


Deployment Flowchart Example

Producing the "Plan of the Day"



Levels of Flowcharts



Guidelines for Flowcharting

- Assemble the right people
- Start with the big picture
- Observe the current process
- Decide on “as-is”, “regulation”, or “ideal” flowchart
- Define the level of detail

Constructing a Flowchart

- Define the process to be flowcharted
- Record the steps, activities, and decisions
- Arrange the sequence of steps
- Draw the flowchart using symbology
- Validate the finished flowchart

Constructing a Deployment Flowchart

- List major steps of the process vertically on the left
- List the responsible process workers across the top
- Place each step in the appropriate column
- Connect the steps

Interpreting a Flowchart

Step 1 - Examine each process step

Bottlenecks? Poorly defined steps?
Ineffective sequence? Delays? Weak links?

Step 2 - Examine each decision symbol

Can this step be eliminated?

Step 3 - Examine each rework loop

Can it be shortened or eliminated?

Step 4 - Examine each activity symbol

Does the step add value for the end-user?

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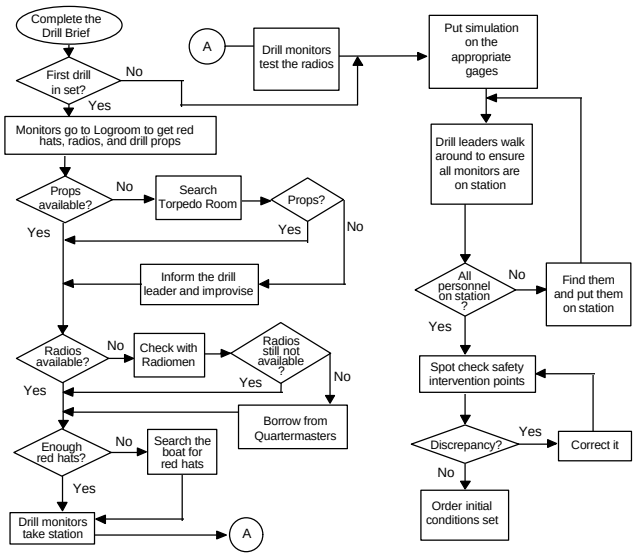
Fire Drill Preparation Flowchart



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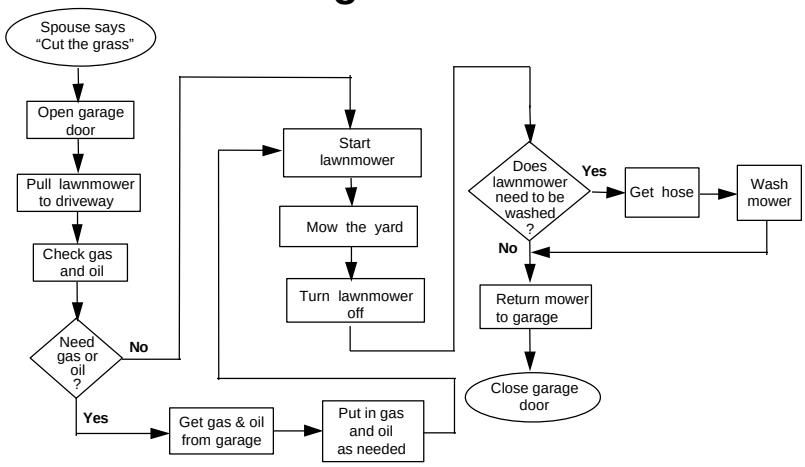
Flowchart Exercise

Construct a mini-level flowchart of "cutting the grass"

Flowchart Exercise Example

"Cutting the Grass"



Brainstorming

An idea-generating technique used by teams to generate many ideas in a short period of time

Benefits of Brainstorming

- **Rapidly produces a large number of ideas**
- **Encourages creativity and innovation**
- **Encourages involvement by all members**
- **Fosters a sense of ownership**
- **Provides input to other tools**

Guidelines for Brainstorming

- Set the format (structured/unstructured)
- Display ideas exactly as presented
- No discussion of input
- Build on others' ideas
- Maintain a brisk pace
- Active participation by everyone

Steps for Brainstorming

- Generate the ideas
  - Clearly state the topic
  - Review the guidelines
  - Collect everyone's ideas
  - Record and display ideas
- Clarify, combine, cancel
  - Clarify the meaning of each item
  - Combine like items
  - Cancel the obvious far out items

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Brainstorming Example

What can be done to ensure the proper disposal of recyclable material on base?

Module 5 **Viewgraph 22**

Brainstorming

Exercise

Affinity Diagram

A tool that organizes large amounts of language data (ideas, opinions, issues) into groupings based on their natural relationships

Use the Affinity Process to:

- Sift through large volumes of data
- Encourage new patterns of thinking

Guidelines for Creating an Affinity Diagram

- "Affinitize" silently
- Go for gut reactions
- Handle disagreements simply
- Generally not used for less than 15 items

Module 5 Viewgraph 25

Step 1 - Display the Generated Ideas

Issues in Implementing Continuous Process Improvement

- Data collection process needs
- Pressure for success
- Lack of follow-up by management
- Which comes first, composing the team or stating the problem?
- Want to solve problem before clearly defined
- Lack of training at all levels
- What are the rewards for using tools
- Unrealistic allotment of time
- Everybody needs to change but me
- Need new data collection system
- Lack of management understanding of need for it
- Developing product without developing process
- Not using collected data
- Too busy to learn
- Don't know what customer wants
- Some people will never change
- Lack of trust in the process
- Behavior modifications may take longer than time available
- Short-term planning mentality
- Competition versus cooperation
- Need to be creative
- Too many projects at once

Module 5 Viewgraph 26

Step 2 - Sort Ideas into Related Groups

Issues in Implementing Continuous Process Improvement

Some people will never change	Developing product without developing process	Lack of follow-up by management	Competition versus cooperation	Data collection process needs
Everybody needs to change but me	Which comes first, composing the team or stating the problem?	Lack of training at all levels	Pressure for success	Need new data collection system
Need to be creative	Don't know what customer wants	Too busy to learn	What are the rewards for using tools	Unrealistic allotment of time
Behavior modifications may take longer than time available	Want to solve problem before clearly defined		Short-term planning mentality	Not using collected data
Lack of trust in the process			Lack of management understanding of need for it	Too many projects at once

Step 3 - Create Header Cards

Issues in Implementing Continuous Process Improvement

(Header Cards)

- **Breaking through old way "Dinosaur" thinking**
- **Lack of planning**
- **Organizational issues**
- **Old management culture**
- **Lack of TQL knowledge**

Step 4 - Draw the Finished Affinity Diagram

Issues in Implementing Continuous Process Improvement

Breaking through old way "Dinosaur" thinking	Lack of planning	Organizational issues	Old management culture	Lack of TQL knowledge
Some people will never change	Developing product without developing process	Lack of follow-up by management	Competition versus cooperation	Data collection process needs
Everybody needs to change but me	Which comes first, composing the team or stating the problem?	Lack of training at all levels	Pressure for success	Need new data collection system
Need to be creative	Don't know what customer wants	Too busy to learn	What are the rewards for using tools	Unrealistic allotment of time
Behavior modifications may take longer than time available	Want to solve problem before clearly defined		Short-term planning mentality	Not using collected data
Lack of trust in the process			Lack of management understanding of need for it	Too many projects at once

Affinity Exercise

Use the list generated during the Brainstorming Exercise

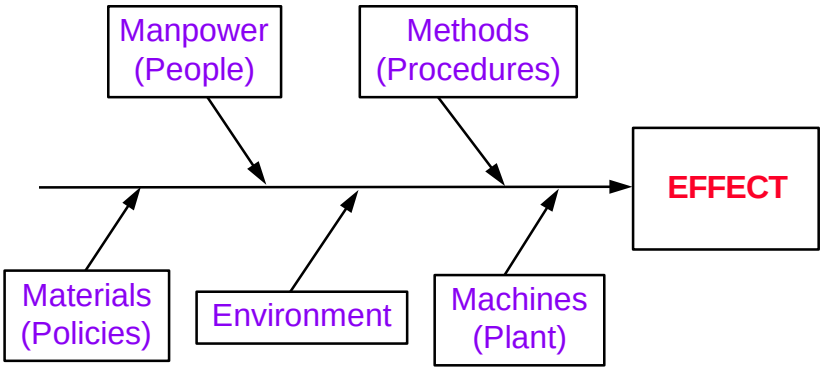
Cause and Effect Diagram

A graphic tool that helps identify, sort, and display possible causes of a problem or quality characteristic

Benefits of Cause and Effect Diagrams

- **Uses an orderly, easy-to-read format**
- **Increases knowledge of the process**
- **Indicates possible causes of variation**
- **Identifies areas for collecting data**

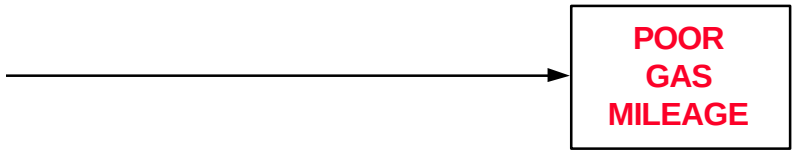
Basic Layout of Cause and Effect Diagrams



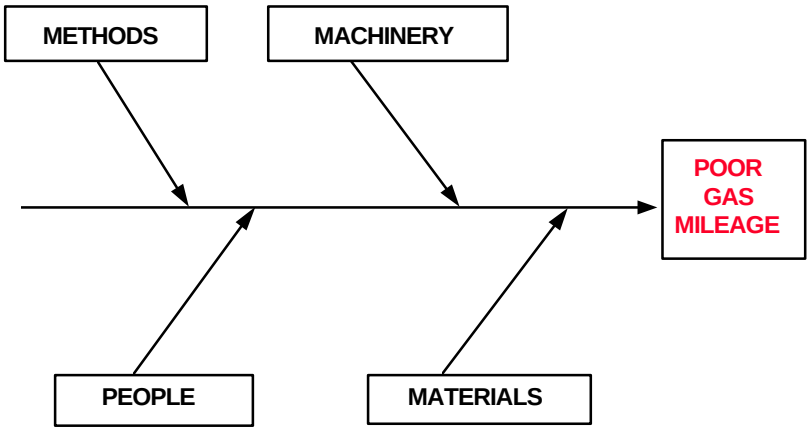
Step 1 - Identify and define the effect

- Decide on the effect to examine
- Develop clear definitions
- Phrase effect as
  - positive (an objective) or
  - negative (a problem)

Step 2 - Fill in the effect box and draw the spine



Step 3 - Identify the main branches



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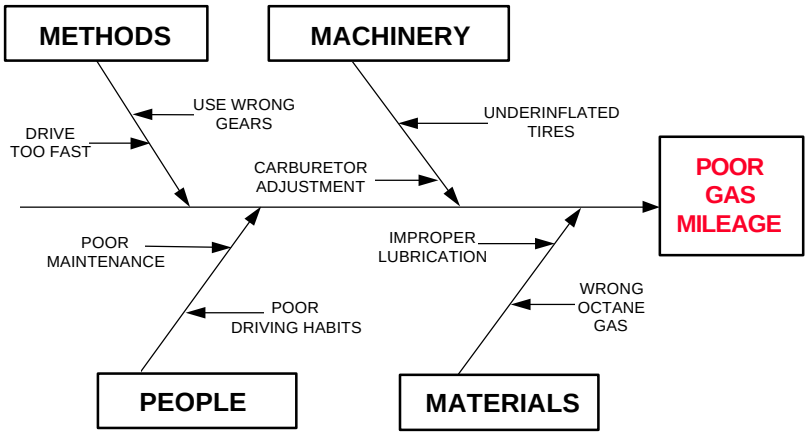
Step 4 - Identify causes influencing the effect



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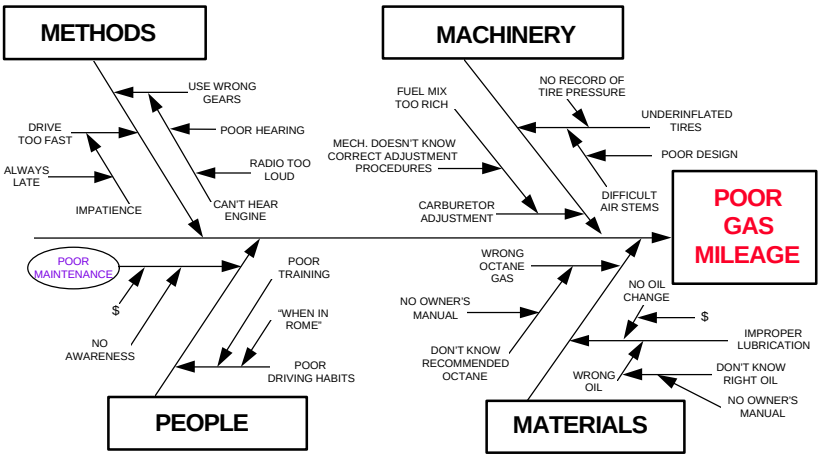
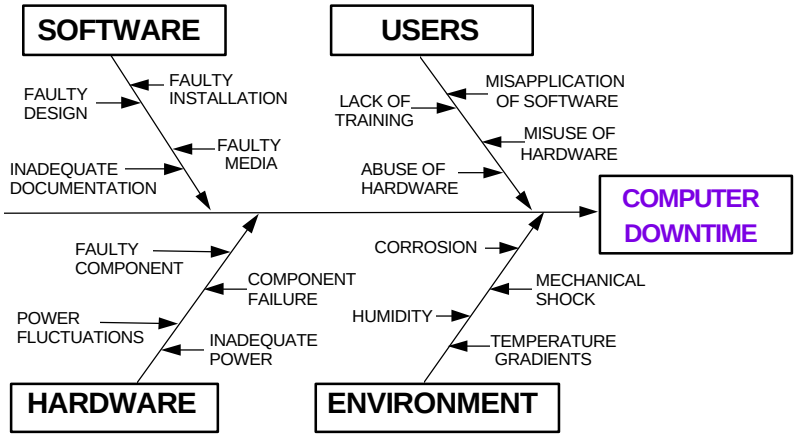
Step 5 - Add detailed levels
Step 6 - Analyze the diagram



Cause and Effect Diagram Example



Cause and Effect Diagram Exercise