

## Basic Tools of TQM



Seven Basic Tools of Quality is a designation given to a fixed set of graphical techniques identified as being most helpful in troubleshooting issues related to quality.

*They are called basic because they are suitable for people with little formal training in statistics and because they can be used to solve the vast majority of quality-related issues.*



## Basic Tools of TQM



- Check Sheet
- Control Charts
- Pareto Chart
- Scatter Diagram
- Cause and Effect Diagram
- Flow Chart
- Histogram



## Basic Tools of TQM



### Check Sheet

A generic Tool which can be used for collection and analysis of data – A structured and prepared form that can be adapted for wide variety of issues

#### When to Use a Check Sheet

- When data can be observed and collected repeatedly by the same person or at the same location
- When collecting data on the frequency or patterns of events, problems, defects, defect location, defect causes
- When collecting data from a production process

## Basic Tools of TQM



### Example of Check Sheet

Complaint Checksheet						
	Mon	Tues	Wed	Thurs	Fri	Total
No. Users	123	110	130	135	128	626
Complaints						
No. Complaints	17	20	24	21	23	105
Percent of users complaining	14%	18%	18%	16%	18%	17%



## Basic Tools of TQM

### Control Charts

A graphical technique to study the changes to a process over time

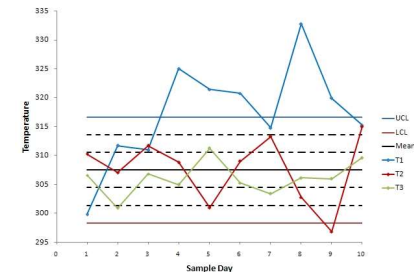
#### When to Use a Control Chart

- When controlling ongoing processes by finding and correcting problems as they occur
- When predicting the expected range of outcomes from a process
- When determining whether a process is stable (in statistical control)
- When analyzing patterns of process variation from special causes (non-routine events) or common causes (built into the process)
- When determining whether your quality improvement project should aim to prevent specific problems or to make fundamental changes to the process



## Basic Tools of TQM

### Example of Control Charts



## Basic Tools of TQM

### Pareto Chart

A graphical technique used to identify the significance of individual factors

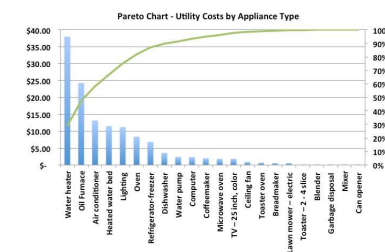
#### When to Use a Pareto chart

- When analyzing data about the frequency of problems or causes in a process
- When there are many problems or causes and you want to focus on the most significant
- When analyzing broad causes by looking at their specific components
- When communicating with others about your data



## Basic Tools of TQM

### Example of Pareto Chart



## Basic Tools of TQM



### Example

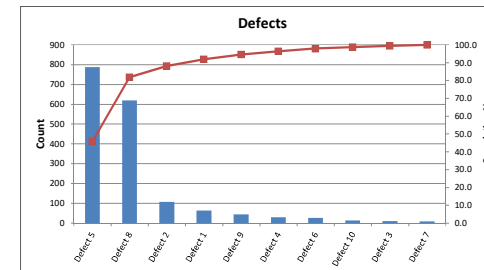
Complaint	Count
Defect 1	65
Defect 2	109
Defect 3	12
Defect 4	30
Defect 5	789
Defect 6	27
Defect 7	9
Defect 8	621
Defect 9	45
Defect 10	15

Complaint	Count	Cumulative Count	Cumulative %
Defect 5	789	789	45.8
Defect 8	621	1410	81.9
Defect 2	109	1519	88.2
Defect 1	65	1584	92.0
Defect 9	45	1629	94.6
Defect 4	30	1659	96.3
Defect 6	27	1686	97.9
Defect 10	15	1701	98.8
Defect 3	12	1713	99.5
Defect 7	9	1722	100.0

## Basic Tools of TQM



### Example



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### Scatter Diagram

Used to identify the relation between variables, by plotting pairs of numerical data, with one variable on each axis

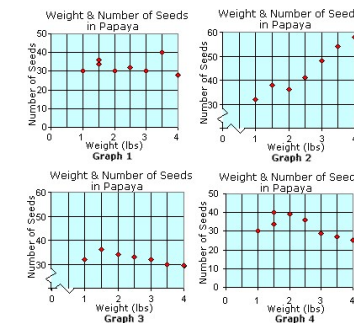
#### When to Use a Scatter Diagram

- When you have paired numerical data
- When your dependent variable may have multiple values for each value of your independent variable
- When trying to determine whether the two variables are related
  - When trying to identify potential root causes of problems
  - When determining whether two effects that appear to be related both occur with the same cause
  - When testing for autocorrelation before constructing a control chart

## Basic Tools of TQM



### Example of Scatter Diagram



Even if the scatter diagram shows a relationship, do not assume that one variable caused the other. Both may be influenced by a third variable.

## Basic Tools of TQM

### Cause and Effect Diagram

Also called Ishikawa or Fishbone Diagram

Used to structure the Brain Storming Session – to sort ideas into useful categories

Many Possible Causes are identified for a stated problem and the effect on the problem are identified

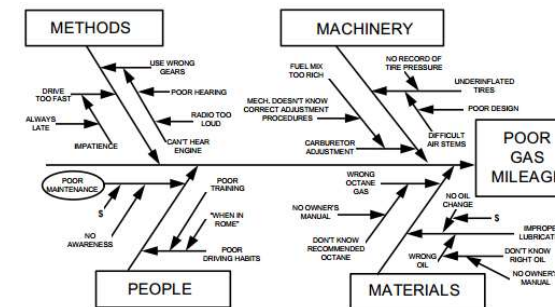
#### When to Use a Cause and Effect Diagram

- When identifying possible causes for a problem
- Especially when a team's thinking tends to fall into ruts



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### Example of Cause and Effect Diagram



## Basic Tools of TQM

### Flow Chart

Also called Stratification Charts

Used to identify the patterns within the data collected from multiple sources and clubbed together – to identify the meaning of the vast data by identifying patterns

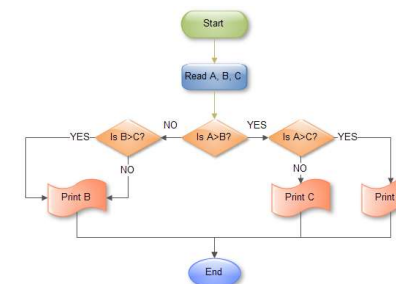
#### When to Use a Flow Chart

- To develop understanding of how a process is done
- To study a process for improvement
- To communicate to others how a process is done
- When better communication is needed between people involved with the same process
- To document a process
- When planning a project.



## Basic Tools of TQM

### Example of Flow Chart



## Basic Tools of TQM

### Histogram

Used to identify the frequency of occurrence of a variable in a set of data – looks very much like a bar chart

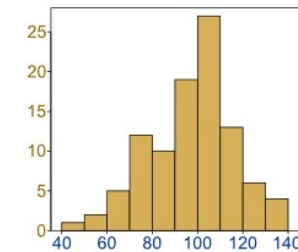
#### When to Use a Histogram

- When the data are numerical
- When you want to see the shape of the data's distribution, especially when determining whether the output of a process is distributed approximately normally
- When analyzing what the output from a supplier's process looks like
- When seeing whether a process change has occurred from one time period to another
- When determining whether the outputs of two or more processes are different
- When you wish to communicate the distribution of data quickly and easily to others



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### Example of Histogram



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### Example

Data	
83	75
78	83
91	84
87	79
77	90
80	74
77	81
87	87
84	71
72	76
77	83
80	90
93	80
96	81
80	87
78	83
72	90
87	87
95	93
83	87
90	74
81	91
87	88
93	73
89	73

Data	50
Max Value	96
Min Value	71
Range	25
No of Bars	9
Width	3

Bars	Bars coded	Frequency
70-72	72	3
73-75	75	5
76-78	78	6
79-81	81	8
82-84	84	7
85-87	87	8
88-90	90	6
91-93	93	5
94-96	96	2

