Operations Management
MBA (II) Semester
Quality Management Part II
Total Quality Management
&
Six Sigma

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TOTAL QUALITY

- Total Quality is defined as mobilisation of the whole organization to achieve quality continuously, economically and in entirety.

TOTAL QUALITY MANAGEMENT

- TQM is a corporate business management philosophy which recognises that customer needs and business goals are inseparable.
- It expands the traditional view i.e. looking at only the quality of the end product/service to looking at quality of every aspect of the process.
- It can be conceptualised into three process
  - Quality Process for understanding the customer
  - Management process for continuous improvement

    To keep pace with changing requirement, competitive environment and technological advancement.
  - People process: initiating and maintaining TQM through every employee involvement.

Total Quality Management

It can be thus viewed as a process where the top management along with the people in the organization ensure improvement in the product quality and work environment continuously at all stages and levels with the aim of improving customers and employees satisfaction

- Total Quality is the performance superiority in delighting customers.
- The means used are peoples committed to employing organizational resources to provide value to the customer by doing the right things the first time and every time.

- Delighting customer
  - If the firm anticipates customers requirement and strive to exceed them it will not only delights customers but also provides firms with advantages that take time for the others to emulate.
- Provide Value
  - Value = Quality / cost
- Doing the right things for the first time and every time

Objectives of TQM

- Define and specify quality policies and objective
- Strong customer focus
- Organisation of quality activities in performance with stated quality policies and objectives.
- Complete quality equipment identification.
- Periodic audit of system activities

Principles of TQM

- Top Management Commitment
- Customer Focus
- Strive for quality in all things
- The production process and work methods must be designed consciously to achieve quality conformance.
- Responsibility of Every Employee
- Encourage Team work & cooperation
- Continuous improvement
- Extend TQM Programme to the supplier

Requirement for Successful implementation of TQM

- Committed and involved management to provide long term organizational support.
- Focus on customer statisfaction
- Effective involvement of workforce.
- Treating Supplier as a partner.
- Establish performance measures for the process.
- Quality Costs
- Recognition & Rewards

Elements of TQM / TQM Practices

1. Continual improvement / Kaizen
2. Competitive benchmarking
3. Employee empowerment
4. Team approach
5. Decisions based on facts
6. Knowledge of tools
7. Supplier & Supplier quality
8. Champion
9. Quality at the source

1. Continuous Improvement

- Philosophy that seeks to make never-ending improvements to the process of converting inputs into outputs.
- Kaizen: Japanese word for continuous improvement.
- Kaizen refers to continuous and ongoing improvement in all activities of the organization from product development to industrial relation management to total product maintenance and ultimately to customer satisfaction. It is the result of the combination of small changes over a period of time.
- Kaizen Umbrella: Application of Kaizen

  - Customer Orientation
  - Total Quality Control
  - Quality Circles
  - Suggestion Systems
  - Total Prodcutive Maintenance(TPM)
  - Productivity Improvement
  - New Product Development
  - Labour-Management Relations
  - Zero Defects
  - Just-in-Time Systems

2. Competitive Benchmarking

Process of Benchmarking:

- Identify a critical process that needs improving
- Identify an organization that excels in this process
- Contact that organization
- Analyze the data
- Improve the critical process

3. Employee Empowerment

- It provides incentive to employee to identify the problems and helps the management to solve the problem. It helps the staff to increase creativity, productivity, customer service and learn from their mistakes

4. Team Approach

- The use of teams for problem solving
- Taking advantage of group synergy
- Get people involved
- Promote a spirit of cooperation
- Shares values among employees

5. Decisions based on facts

- Management and employees should gather and analyze data on the basis of facts and not on opinions, in order to make appropriate decisions.

6. Knowledge of tools

- Employees & Managers have appropriate knowledge about the quality tools
- They should be trained to use these tools
- Eg. SPC charts, Flowcharts, Histograms, Parento analysis, Fishbone Diagram etc.

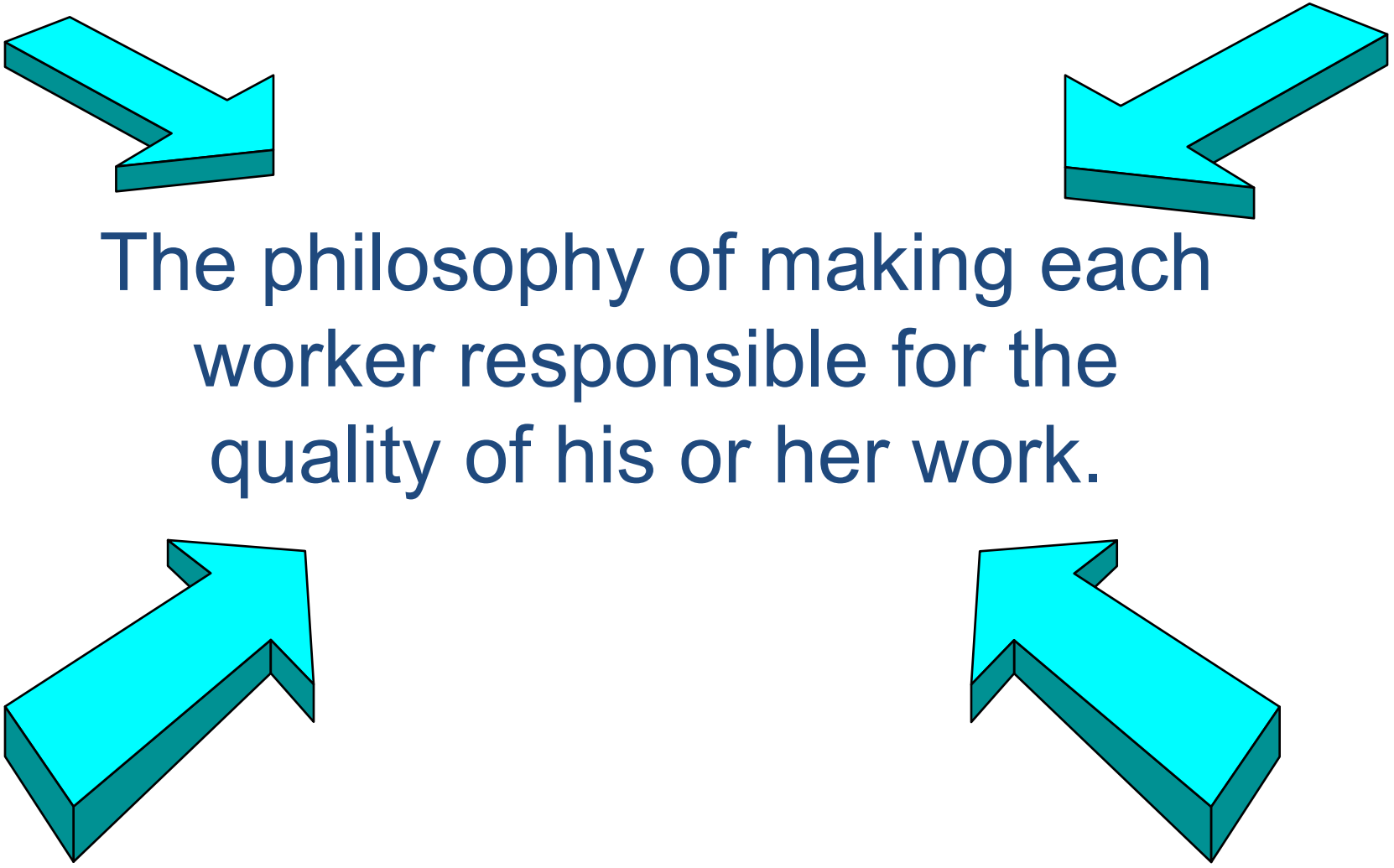
7. Supplier & Supplier Quality

- Suppliers must be included in quality assurance and quality improvement efforts so that their processes are capable of delivering quality parts/ materials in a timely manner.
- Suppliers are partners in the process and long-term relationships are encouraged.

8. Champion

- A TQM champion's job is to promote the value and importance of TQM principles throughout the organization.

9. Quality at the Source



The philosophy of making each worker responsible for the quality of his or her work.

Obstacles to Implementing TQM

- Lack of:
  - Company-wide definition of quality
  - Strategic plan for change
  - Customer focus
  - Real employee empowerment
  - Strong motivation
  - Time to devote to quality initiatives
  - Leadership
- Poor inter-organizational communication
- View of quality as a "quick fix"
- Emphasis on short-term financial results
- Internal political and "turf" wars

Criticisms of TQM

- Blind pursuit of TQM programs
- Programs may not be linked to strategies
- Quality-related decisions may not be tied to market performance
- Failure to carefully plan a program
- Quality efforts may not be tied to results
- Organizations sometimes pursue continuous improvement (i.e. incremental improvement) when dramatic improvement is required.

SIX SIGMA

- Six Sigma is the empirical and statistical technique of process improvement, developed by Motorola in the year 1986 .
- It stands for six standard deviation from mean.
- It aims at maintaining the quality of product near perfection.
- It defines the number of defects experienced by customer per million opportunities for a defect to occur which allows for only 3.4 defects per million opportunities for each product. It provides accuracy of 99.99 % in the output.
- Conceptually
  - Program designed to reduce defects
  - Requires the use of certain tools and techniques

Six Sigma Programs

- Six Sigma programs
  - Improve quality
  - Save time
  - Cut costs
- Employed in
  - Design
  - Production
  - Service
  - Inventory management
  - Delivery

Six Sigma Management

- Providing strong leadership
- Defining performance merits
- Selecting projects likely to succeed
- Selecting and training appropriate people

Six Sigma Technical

- Improving process performance
- Reducing variation
- Utilizing statistical models
- Designing a structured improvement strategy

Six Sigma Team

- Top management
- Program champions: TQM Champion's job is to promote the value and importance of TQM principles throughout the company.
- Master "black belts": have extensive training in statistics and use of quality tools and are mentors of black belts.
- "Black belts": are project team leaders responsible for implementing process improvement process.
- "Green belts": are members of project teams.

Six Sigma Process

- Define
- Measure
- Analyze
- Improve
- Control

DMAIC

METHODS OF GENERATING IDEAS

1. Brainstorming
2. Quality Circles
3. Benchmarking

1. Brainstorming

- Technique of generating free flow of ideas in a group of people.
- In successful brainstorming, criticism is absent, no single member is allowed to dominate and all ideas are welcomed

2. Quality Circles

- Groups of workers that who meet to discuss ways of improving products or processes.
- These circles can motivate workers if handled properly.
- These circles have less authority as compared to the continuous improvement teams.

3. Benchmarking

Process of Benchmarking:

- Identify a critical process that needs improving
- Identify an organization that excels in this process
- Contact that organization
- Analyze the data
- Improve the critical process in your own organization

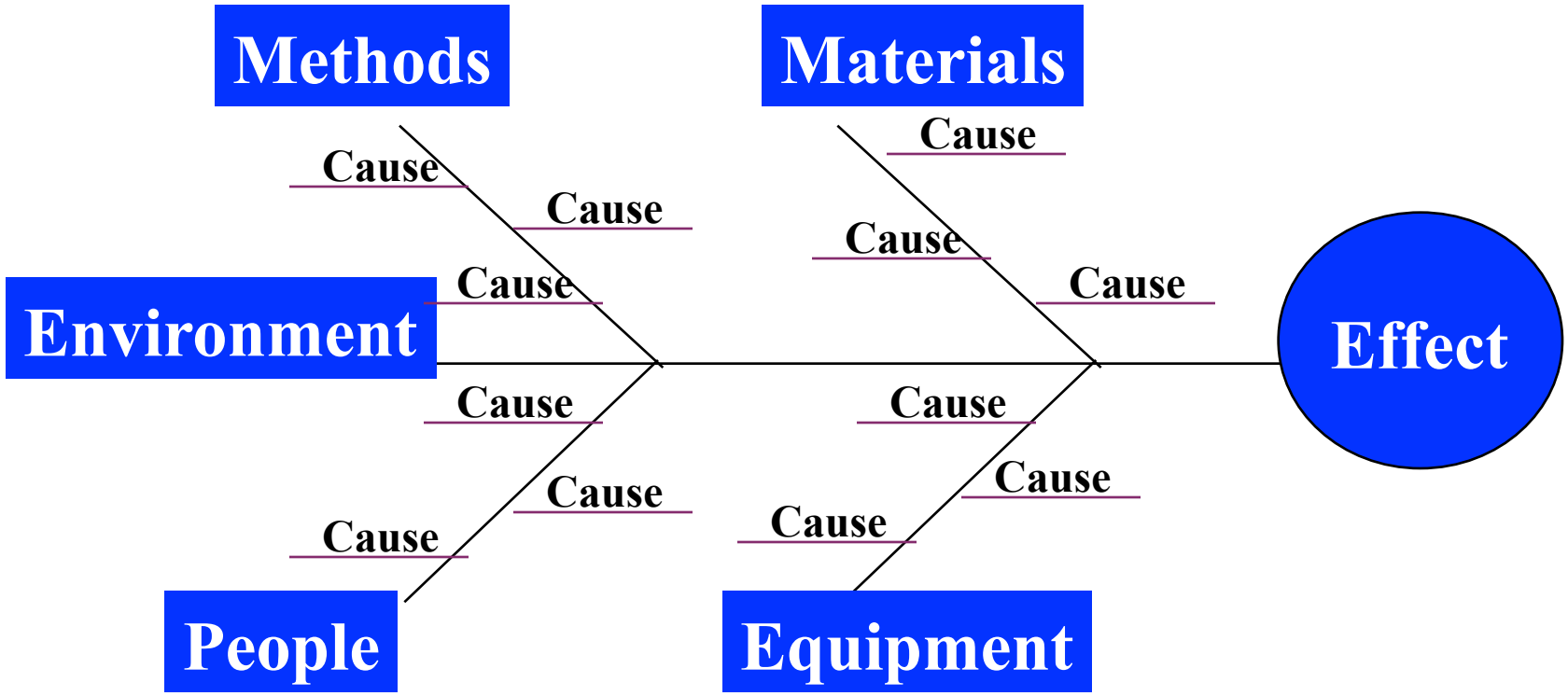
THE BASIC SEVEN TOOLS OF QUALITY

1. Fishbone Diagrams
2. Histograms
3. Pareto Analysis
4. Flowcharts
5. Scatter Plots
6. Check sheets
7. Control Charts

1. Fish bone Diagram (Cause and Effect Analysis)

- Dr. Kaoru Ishikawa, a Japanese quality control statistician, invented the fishbone diagram. Therefore, it may be referred to as the Ishikawa diagram.
- The design of the diagram looks much like the skeleton of a fish. Therefore, it is often referred to as the fishbone diagram.
- It is also called as cause-and-effect analysis.

Cause-and-Effect Diagram



The Basic Seven (B7) Tools of Quality

2. Histograms

- Bar chart
- Used to graphically represent groups of data

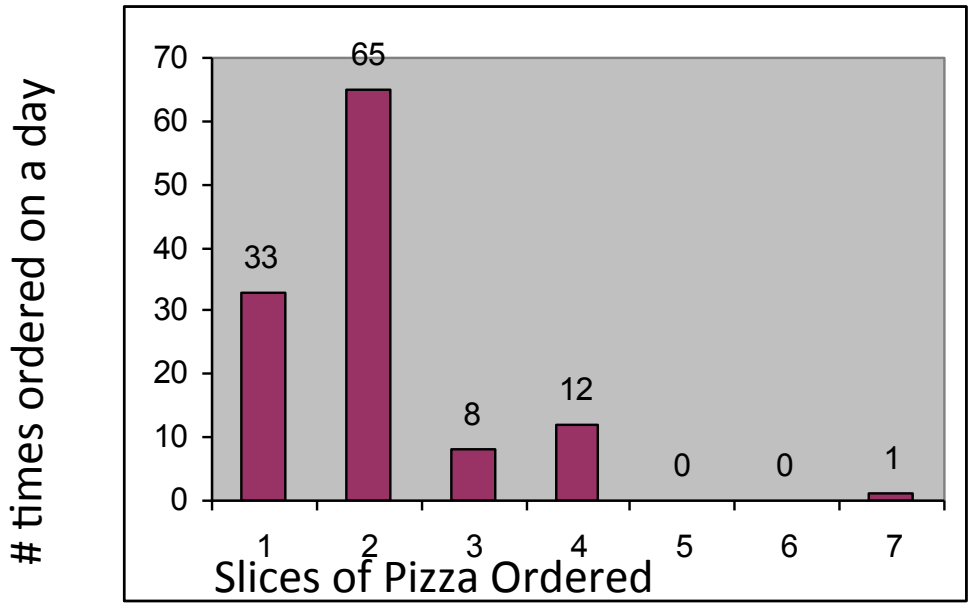
Constructing a Histogram

From a set of data compute

- sum
- mean (x)
- Max
- Min
- Range (max-min)

Pizza Slices Example

Histogram



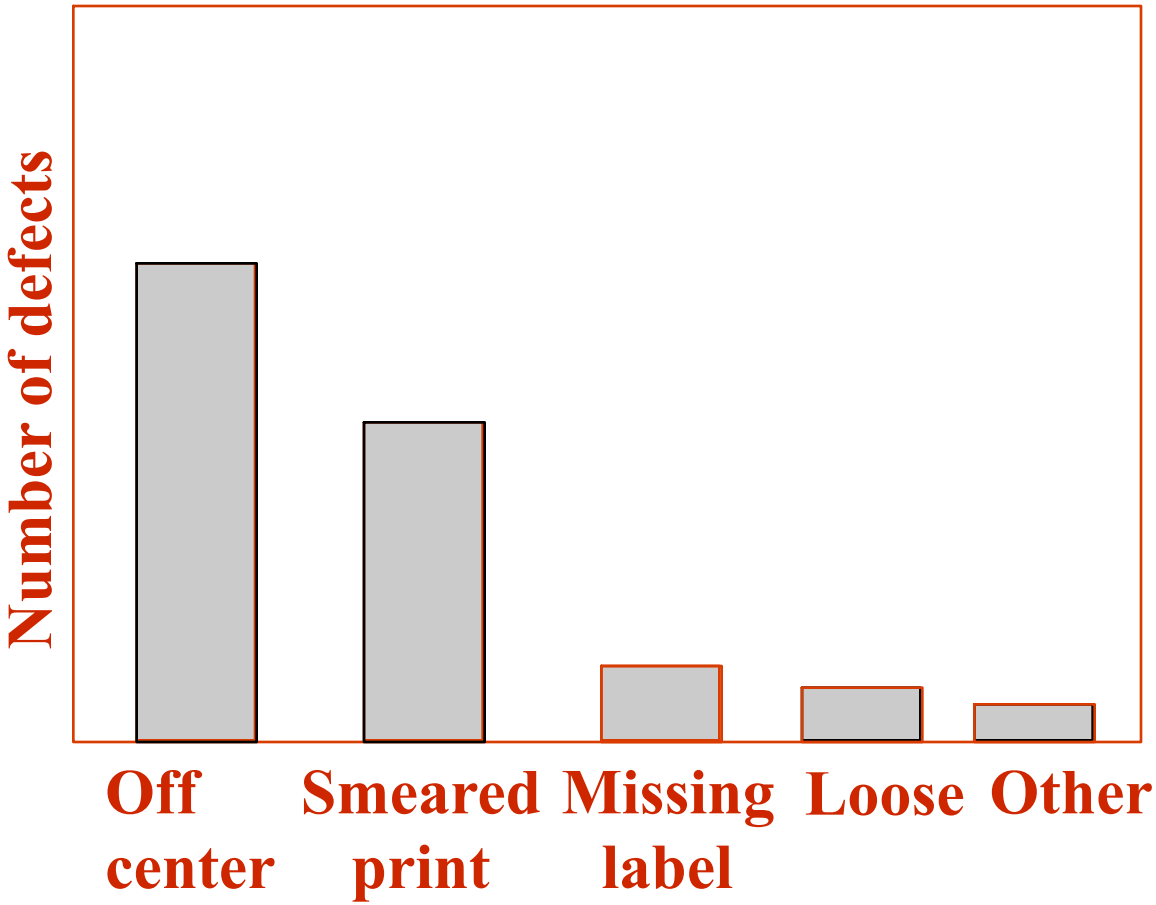
The Basic Seven (B7) Tools of Quality

3. Pareto Analysis

- Very similar to Histograms
- Use of the 80/20 rule
- Use of percentages to show importance
- Vilfredo Pareto (1848-1923) originated the 80/20 Rule, which states that 80% of the problems comes from only 20% of the causes.

Pareto Analysis (example of a label on a water bottle)

80% of the problems may be attributed to 20% of the causes.

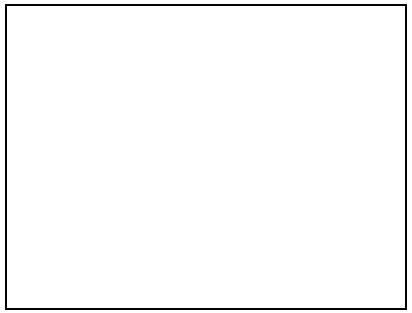


The Basic Seven (B7) Tools of Quality

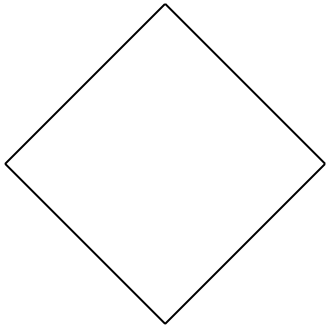
4. Flowcharts

- A graphical picture of a PROCESS
- Some examples:

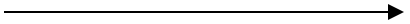
Process



Decision



The process flow

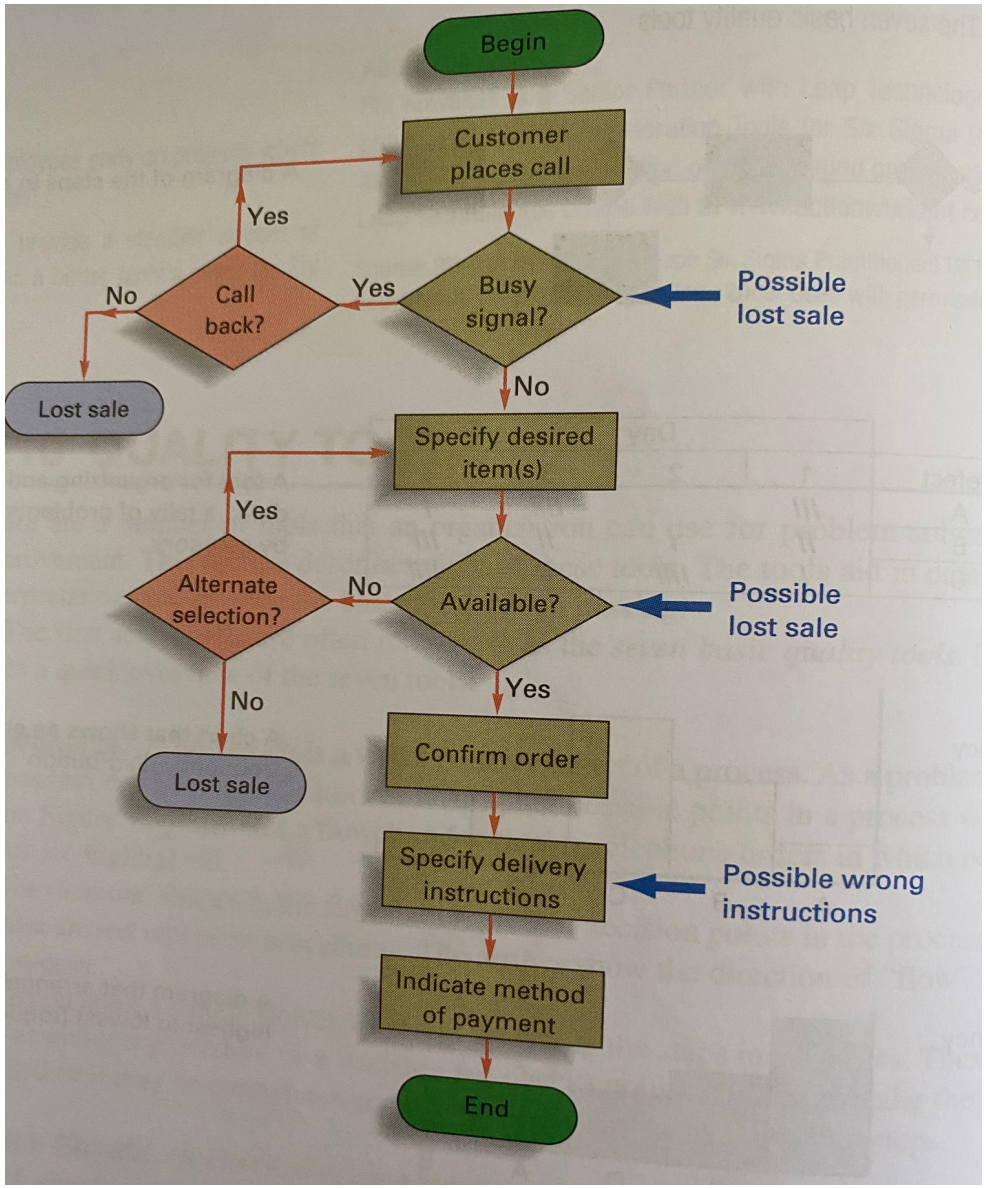


Flowcharts

Don't Forget to:

- Define symbols before beginning
- Stay consistent
- Check that process is accurate

Flowchart: Example



Source: Figure 9.3 page 394 Operations Management, William J Stevenson 12 edition Mc Graw Hill Publication Indian Edition

The Basic Seven (B7) Tools of Quality

5. Scatter Plots

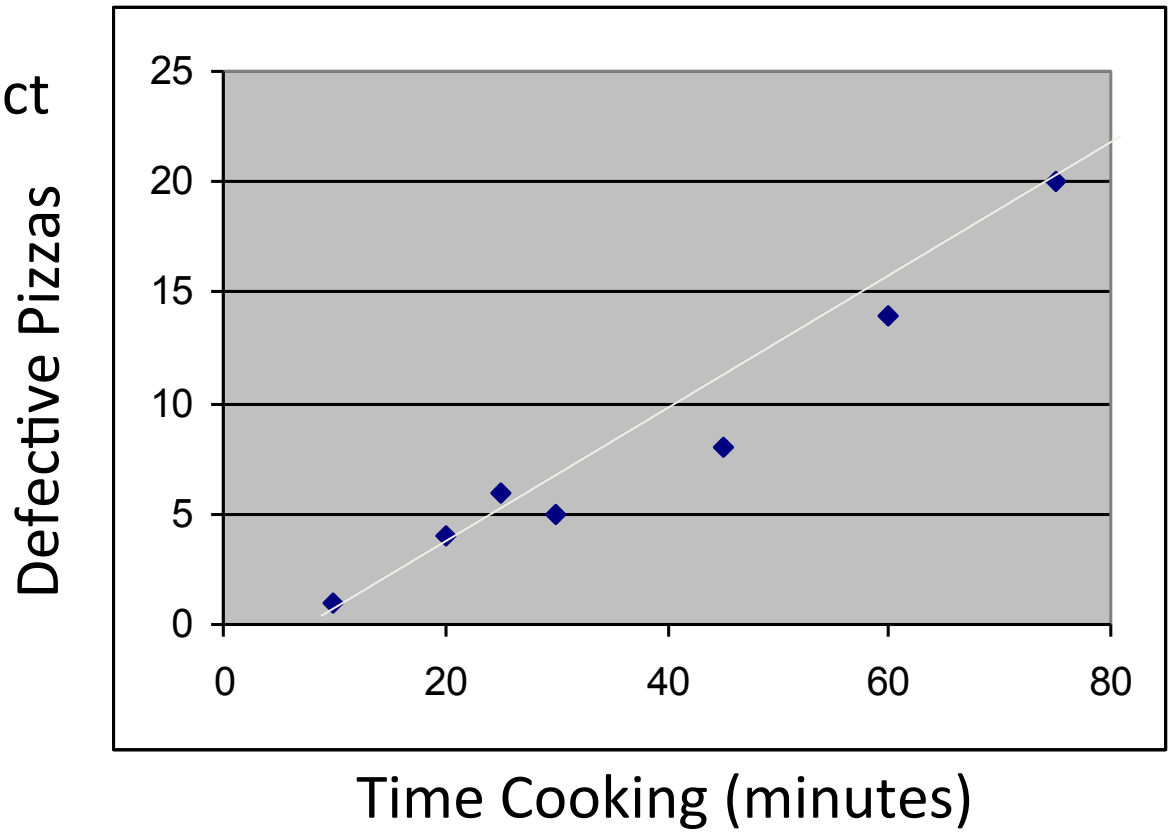
- 2 Dimensional X/Y plots
- Used to show relationship between independent(x) and dependent(y) variables

Pizza example (Scatter Diagram)

Minutes Cooking	Defective Pies
10	1
45	8
30	5
75	20
60	14
20	4
25	6

Scatter Diagrams

- Easier to see direct relationship

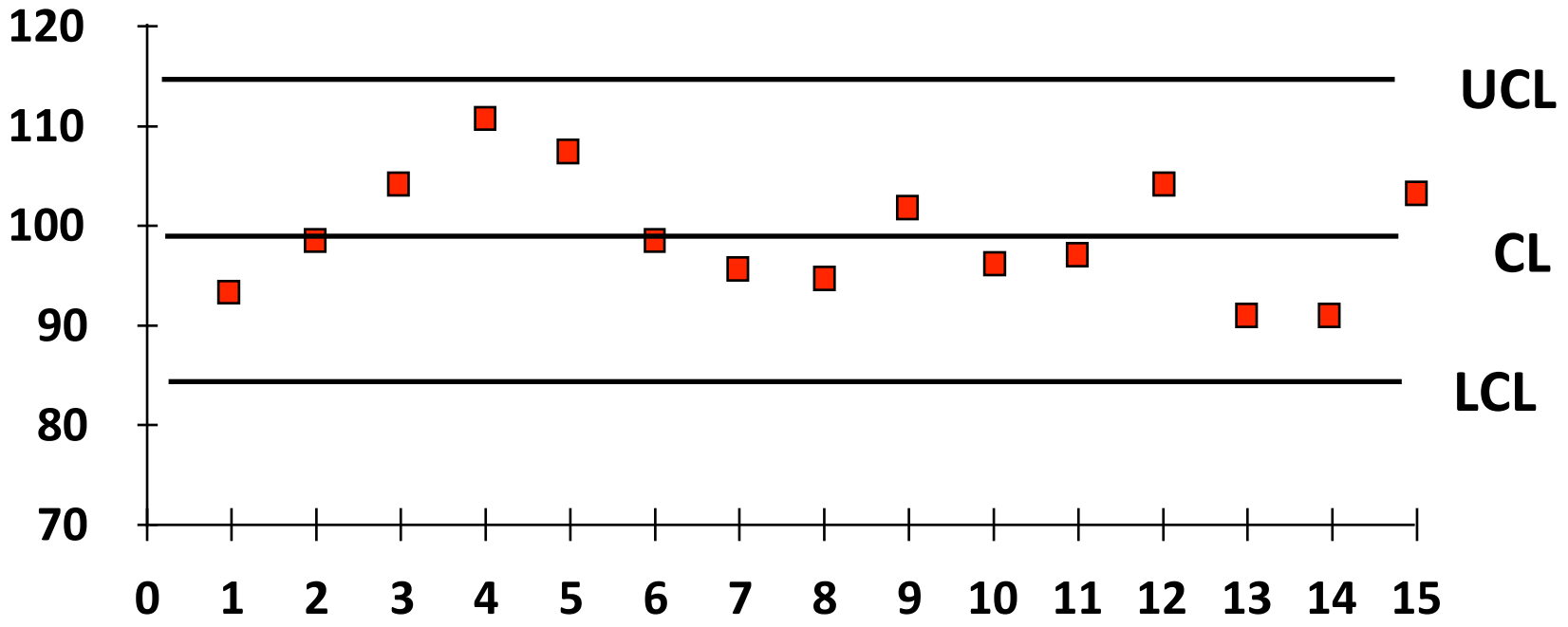


The Basic Seven (B7) Tools of Quality

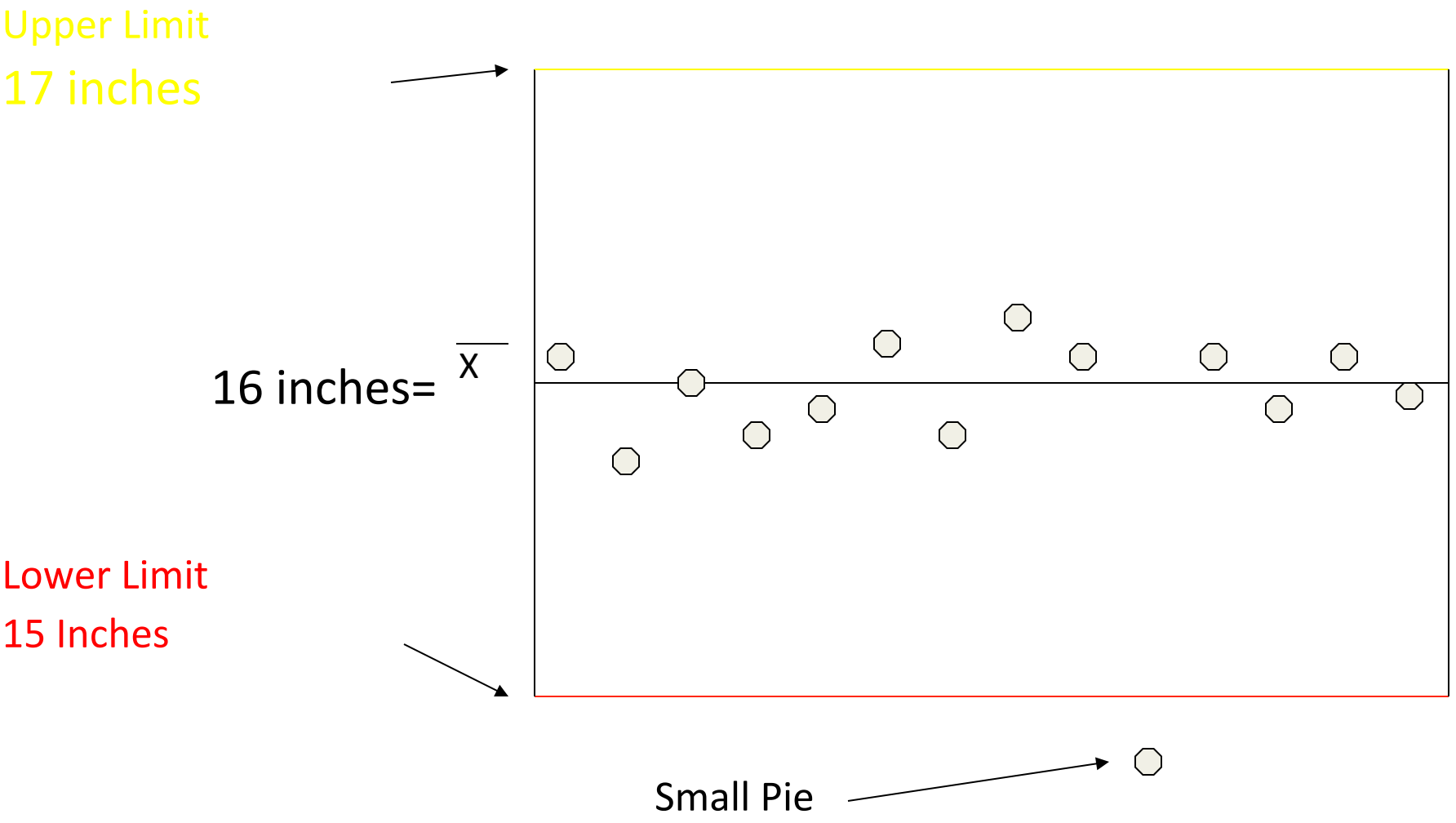
6. Control Charts

- Deviation from Mean
- Upper and Lower Spec's
- Range

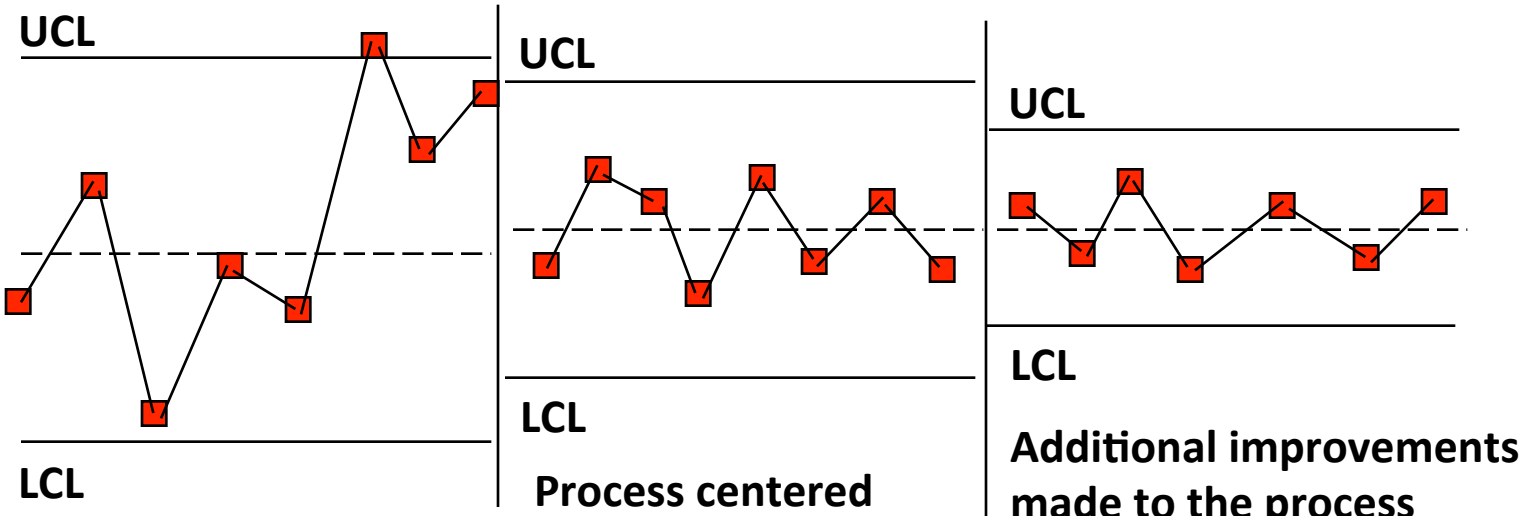
Control Chart



Control Charts



Tracking Improvements



Process not centered and not stable

Process centered and stable

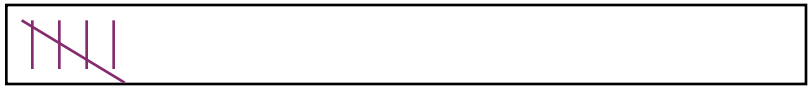
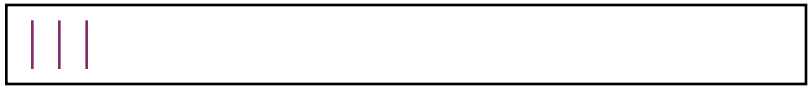
Additional improvements made to the process

The Basic Seven (B7) Tools of Quality

7. Check sheets

- It is a tool for recording direct observations and helping to accumulate facts in the process. The data is recorded on the basis of
  - Attributes
  - Variables

Check Sheet

	Monday
Billing Errors	
Wrong Account	
Wrong Amount	
A/R Errors	
Wrong Account	
Wrong Amount	

Thank You!