Chapter 4
Total Quality Management

Defining Quality – 5 Ways

1. Conformance to specifications
   - Does product/service meet targets and tolerances defined by designers?
2. Fitness for use
   - Evaluates performance for intended (purpose) use
3. Value for price paid
   - Evaluation of usefulness vs. price paid
4. Support services
   - Quality of support after sale
5. Psychological
   - Ambiance, prestige, friendly staff

Manufacturing Quality vs. Service Quality

- Manufacturing quality focuses on tangible product features
  - Conformance, performance, reliability, features
- Service organizations produce intangible products that must be experienced
  - Quality often defined by perceptional factors like courtesy (kindness, respect) , friendliness, promptness (rapidity) , waiting time, consistency.

Cost of Quality

- Quality affects all aspects of the organization.
- Quality has dramatic cost implications of:
  - Quality control costs
    - Prevention costs
    - Appraisal costs
  - Quality failure costs
    - Internal failure costs
    - External failure costs

Cost of Quality – 4 Categories

Prevention costs.	Costs of preparing and implementing a quality plan.
Appraisal costs.	Costs of testing, evaluating, and inspecting quality.
Internal failure costs.	Costs of scrap, rework, and material losses.
External failure costs.	Costs of failure at customer site, including returns, repairs, and recalls.

Early detection/prevention is less costly

Evolution of TQM – New Focus

TQM Philosophy

- TQM Focuses on identifying quality problem root causes .
- Encompasses (include) the entire (total) organization
- Involves the technical as well as people
- Relies (depend) on seven basic concepts of:
  - Customer focus
  - Continuous improvement
  - Employee empowerment
  - Use of quality tools
  - Product design
  - Process management
  - Managing supplier quality

TQM Philosophy - concepts

- Focus on Customer
  - Identify and meet customer needs
  - Stay tuned to changing needs, e.g. fashion styles
- Continuous Improvement
  - Continuous learning and problem solving, e.g. Kaizen, 6 sigma
  - Plan-D-Study-Act (PDSA)
- Benchmarking
- Employee Empowerment
  - Empower all employees; external and internal customers

TQM Philosophy– Concepts con't

- Team Approach
  - Teams formed around processes – 8 to 10 people
  - Meet weekly to analyze and solve problems
- Use of Quality Tools
  - Ongoing training on analysis, assessment, and correction, & implementation tools
  - Studying practices at "best in class" companies

Ways of Improving Quality

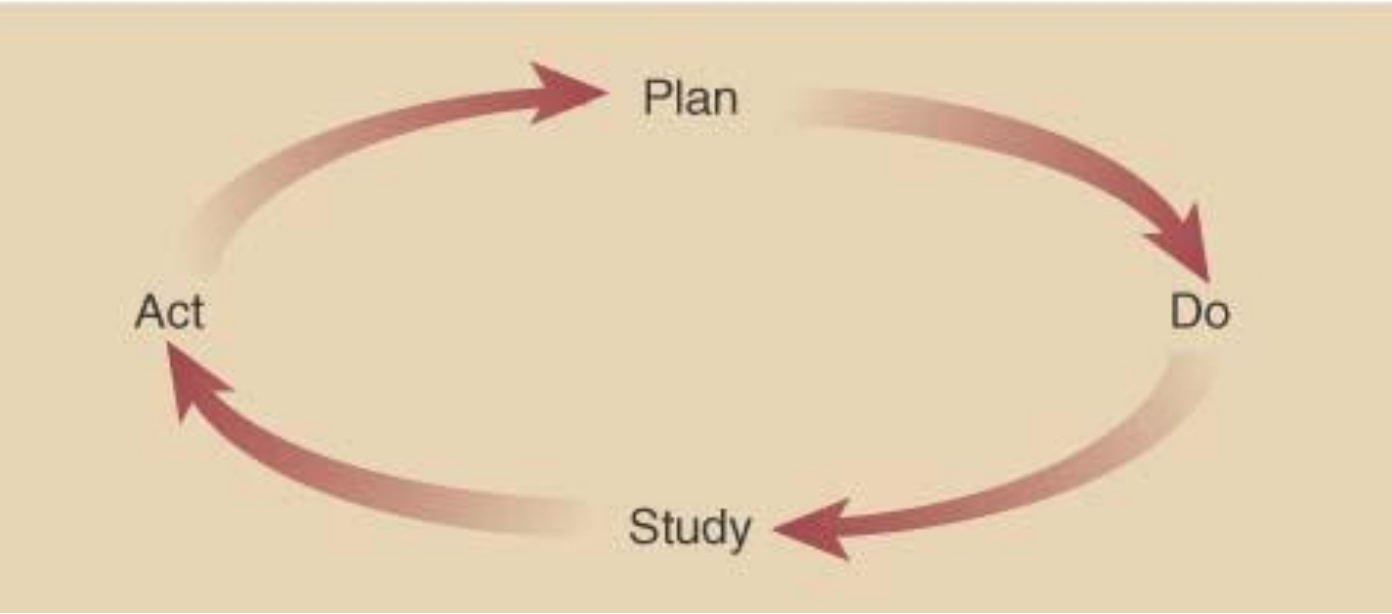
- Plan-Do-Study-Act Cycle (PDSA)
  - Also called the Deming Wheel after originator
  - Circular, never ending problem solving process
- Seven Tools of Quality Control
  - Tools typically taught to problem solving teams
- Quality Function Deployment
  - Used to translate customer preferences to design

PDSA Details

- Plan
  - Evaluate current process
  - Collect procedures, data, identify problems
  - Develop an improvement plan, performance objectives
- Do
  - Implement the plan – trial basis (valid)
- Study
  - Collect data and evaluate against objectives
- Act
  - Communicate the results from trial (judgment)
  - If successful, implement new process

PDSA con't

- Cycle is repeated
  - After act phase, start planning and repeat process

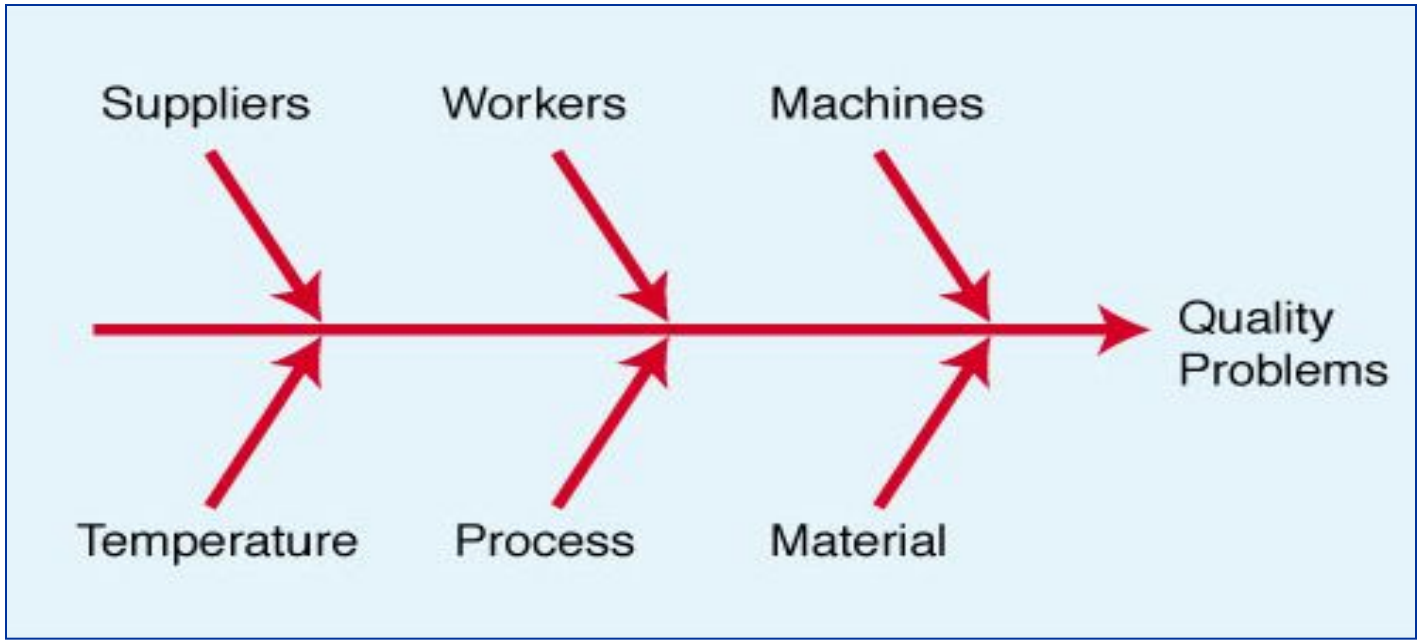


Seven Tools of Quality Control

1. Cause-and-Effect Diagrams
2. Flowcharts
3. Checklists
4. Control Charts
5. Scatter Diagrams
6. Pareto Analysis
7. Histograms

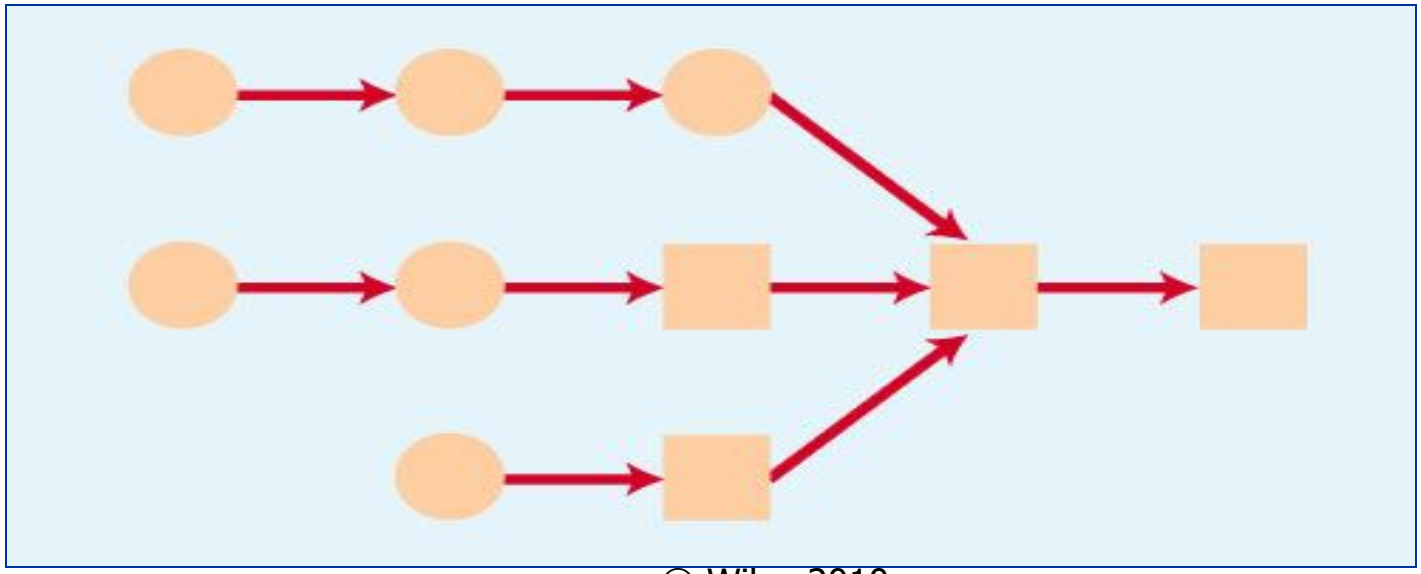
Cause-and-Effect Diagrams

- Called **Fishbone Diagram**
- Focused on solving identified quality problem



Flowcharts

- Used to document the detailed steps in a process
- Often the first step in Process Re-Engineering



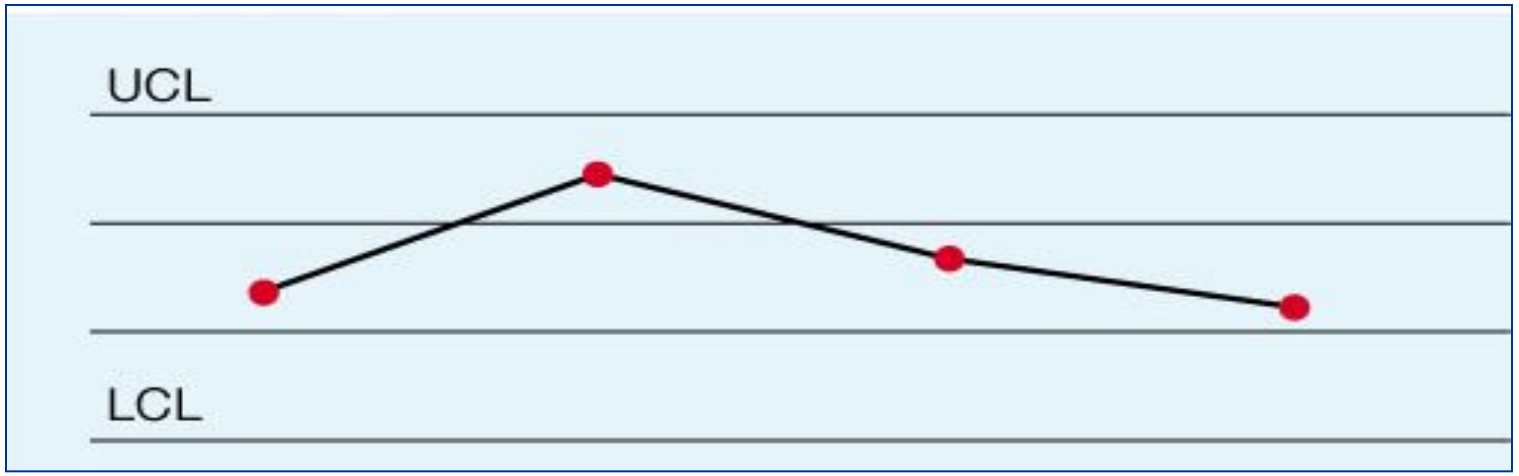
Checklist

Simple data check-off sheet designed to identify type of quality problems at each work station; per shift, per machine, per operator

Defect Type	No. of Defects	Total
Broken zipper	✓✓✓	3
Ripped material	✓✓✓✓✓✓✓	7
Missing buttons	✓✓✓	3
Faded color	✓✓	2

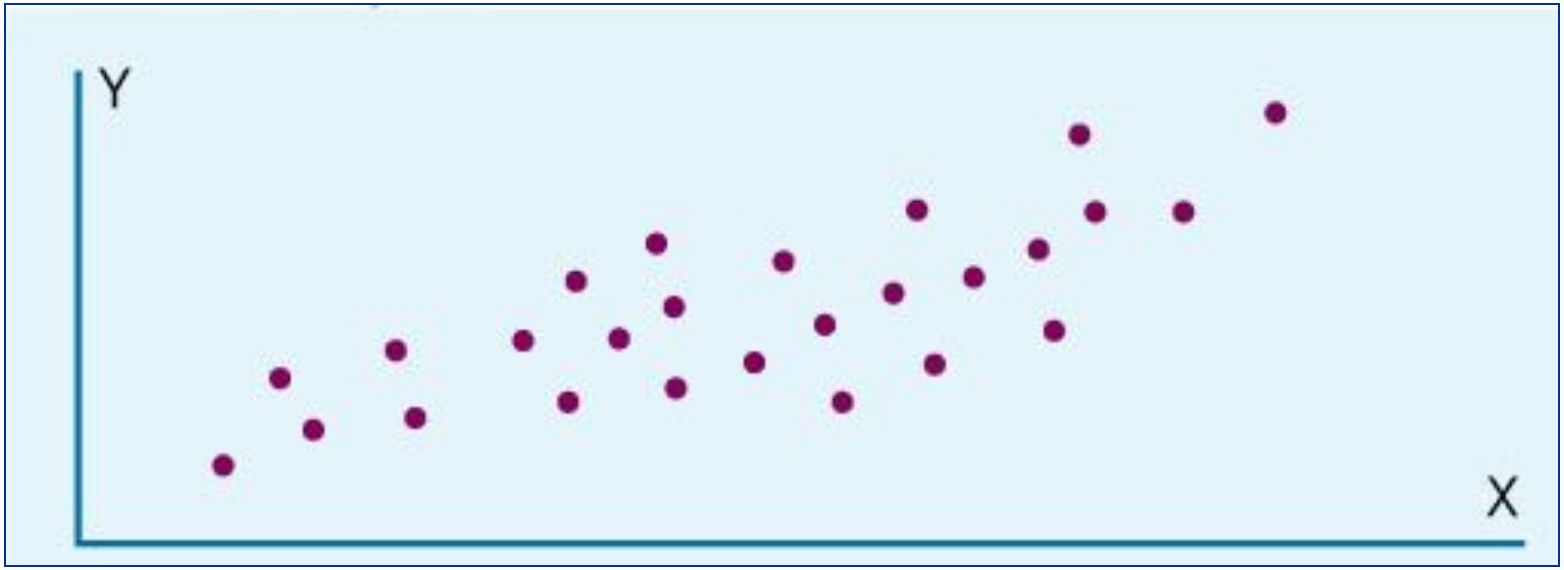
Control Charts

- Important tool used in **Statistical Process Control** –
- The UCL and LCL are calculated limits used to show when process is in or out of control



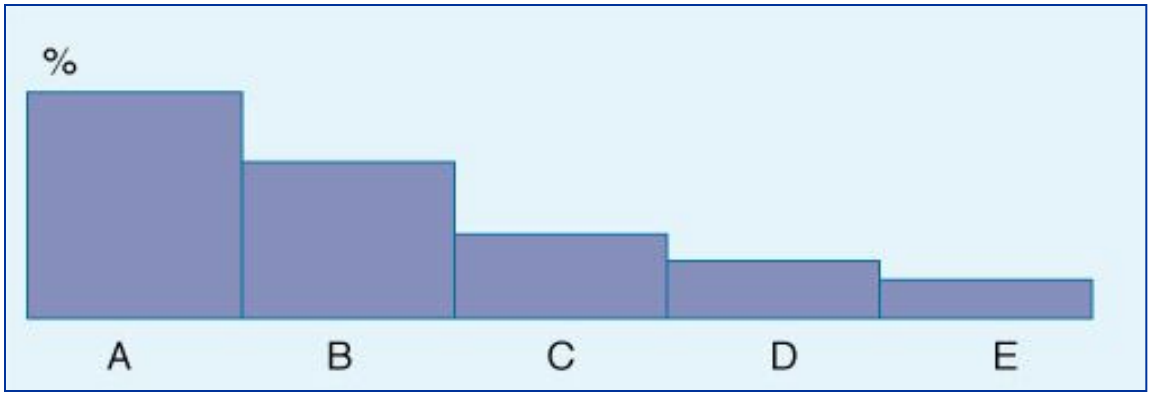
Scatter Diagrams

- **A graph that shows how two variables are related to one another**
- **Data can be used in a regression analysis to establish equation for the relationship**



Pareto Analysis

- Technique that displays the degree of importance for each element
- Named after the 19th century Italian economist; often called the 80-20 Rule
- Principle is that quality problems are the result of only a few problems e.g. 80% of the problems caused by 20% of causes



Histograms

- A chart that shows the frequency distribution of observed values of a variable like **service time** at a bank drive-up window

- Displays whether the distribution is symmetrical (normal) or skewed

Product Design - Quality Function Deployment

- Critical to ensure product design meets customer expectations
- Useful tool for translating customer specifications into technical requirements is Quality Function Deployment (QFD)
- QFD encompasses (involve):
  - Customer requirements
  - Competitive evaluation
  - Product characteristics
  - Relationship matrix
  - Trade-off matrix
  - Setting Targets

Process Management & Managing Supplier Quality

- Quality products come from quality sources
- Quality must be built into the process
- Quality at the source is belief that it is better to uncover source of quality problems and correct it

Quality Awards and Standards

- **Malcolm Baldrige National Quality Award (MBNQA)**
- **The Deming Prize**
- **ISO 9000 Certification**
- **ISO 14000 Standards**

MBNQA- What Is It?

- Award named after the former Secretary of Commerce – Reagan Administration
- Intended to reward and stimulate quality initiatives
- Given to no more that two companies in each of three categories; manufacturing, service, and small business
- Past winners; Motorola Corp., Xerox, FedEx, 3M, IBM, Ritz-Carlton

The Deming Prize

- **Given by the Union of Japanese Scientists and Engineers since 1951**
- **Named after W. Edwards Deming who worked to improve Japanese quality after WWII**
- **Not open to foreign companies until 1984**
- **Florida P & L was first US company winner**

ISO Standards

- ISO 9000 Standards:
  - Certification developed by International Organization for Standardization
  - Set of internationally recognized quality standards
  - Companies are periodically audited & certified
  - ISO 9000:2000 QMS – Fundamentals and Standards
  - ISO 9001:2000 QMS – Requirements
  - ISO 9004:2000 QMS - Guidelines for Performance
  - More than 40,000 companies have been certified
- ISO 14000:
  - Focuses on a company's environmental responsibility

Why TQM Efforts Fail

- Lack of a genuine (really) quality culture
- Lack of top management support and commitment
- Over- and under-reliance (dependence) on SPC methods

TQM Within (organization Management) OM

- TQM is broad sweeping organizational change
- TQM impacts
  - Marketing – providing key inputs of customer information
  - Finance – evaluating and monitoring financial impact
  - Accounting – provides exact costing
  - Engineering – translate customer requirements into specific engineering terms
  - Purchasing – acquiring materials to support product development
  - Human Resources – hire employees with skills necessary
  - Information systems – increased need for accessible information