
Quality Management

Plan of the Day

- Course outline and policy
- Coverage of Quality topics.
- Homework distribution
- Cases presentations.
- Cases assessment

Objectives of Quality Management Module

- Basics of Quality
- Management responsibility for quality
- Quality policy
- Quality chain
- Quality control versus quality assurance and continuous improvement

Objectives of Quality Management Module

- Quality Techniques
- Total quality management
- SPC and TQM Implementation
- Cases related to quality
- Quality Guru

A Teacher and Students Seeking Quality A Case

- A teacher is teaching a class with 12 students. In the first meeting he asked the students to divide themselves into teams of three for cases studies and team work. Also he requested each team to select a name, nominate a coordinator and provide their preferences regarding areas for case studies and projects. The following has happened:

Teacher and Students Seeking Quality A Case

- After two days one team sent its members, name and areas of preferences.
- The teacher sends a reminder after 7 days.
- The second team information came after 7 days however missing coordinator and preferences.
- The second team sends coordinator and preferences a day latter.

Teacher and Students Seeking Quality A Case

- The third team came after 7 days and 5 hours. Information about coordinator and preferences are missing. No final agreement on team name.
- Coordinator and preferences for team three are sent after 15 days, i.e after 8 days from team formation.
- After 17 days the fourth team details arrived. Team name missing and their message is cluttered.

Quality Issues

- Still information not complete. Can this be regarded as a defect?
- It took 17 days to get meaningful information. Is this adequate response time?
- The teacher wrote three e-mails to get the information? Is this needed?
- The e-mail message for the last team was cluttered. Is this a quality issue?

Quality Issues

- Team one did his part correct in 2 days. Does he shares the class problem?
- Who is the customer and who is the service or product provider?
- Is the customer satisfied?

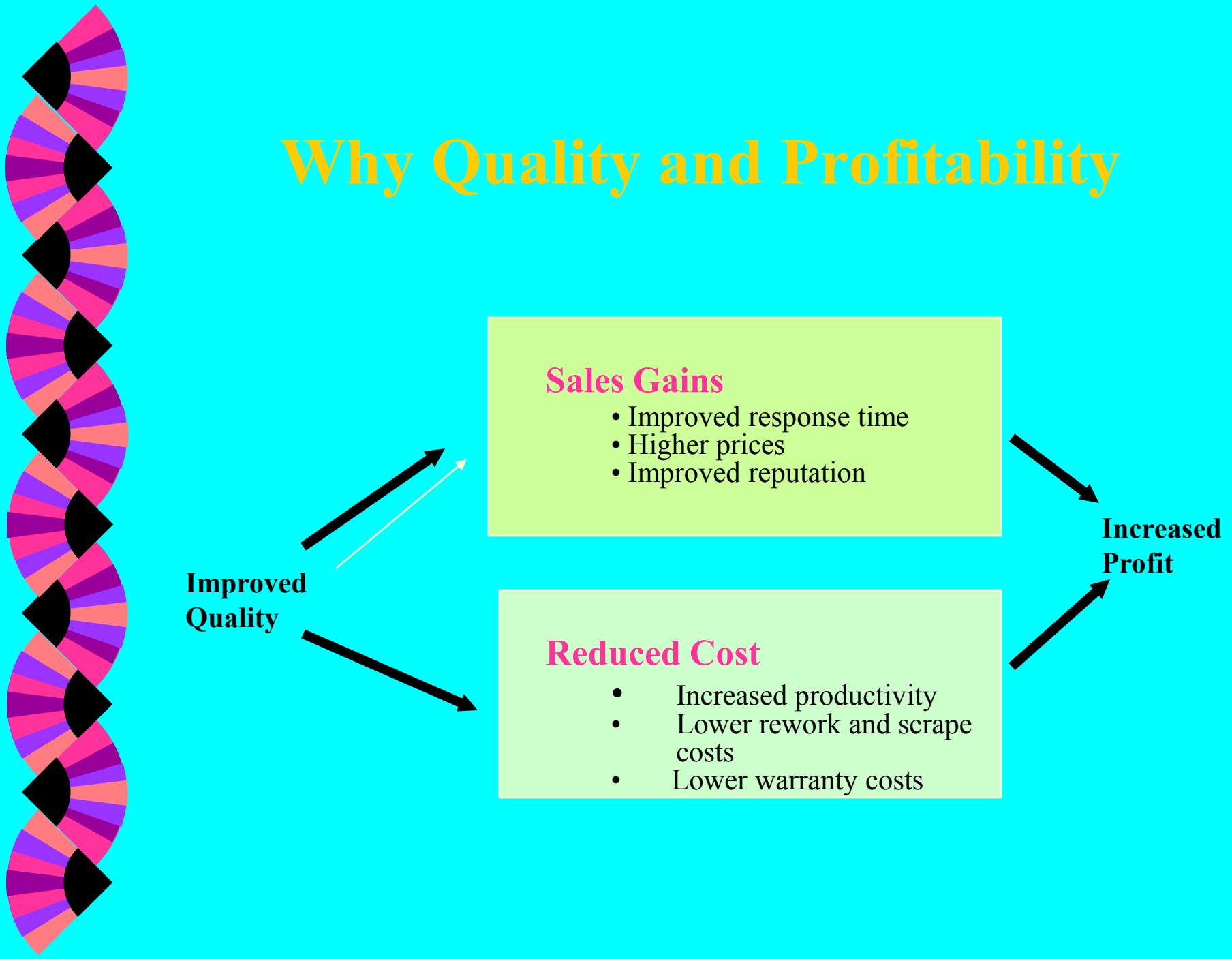
Quality Issues

- How do we fix the situation to improve quality?
- What is quality in this case?
- How do we measure quality in this case?

Quality Issues

- Who is responsible for quality?
- How to deliver quality?
- How can we improve the processes used to deliver quality?

Why Quality and Profitability



Basics of Quality

- What is quality?

- Fitness for purpose or use (Juran)
- Conformance to requirement specifications (Crosby)
- *Quality* is the ability of a product or service to consistently meet or exceed customer expectations (Textbook and ASQ).

Basics of Quality

- A product or service's nature or features that reflect capacity to satisfy express or implied statements of need (Deming).
- A product and service characteristics as offered by design, marketing, manufacture, maintenance and service that meet customer expectations (Feigenbaum)

Quality Basics

- GSA defines it as: “ Meeting the customer needs the first time and every time”.
- Boeing defines it as: “ Providing our customer with products and services that consistently meet the needs and the expectation”.
- Federal Express Defines it as :

“ Performance to the standard expected by customer”.

Basics of Quality

- Quality is not only product and services but also include Processes, Environment and People.

  Therefore a more general definition is needed

" Quality is a dynamic state associate with products, people, processes and environment that meets or exceeds customer expectations"An extended definition of quality is:

Dimensions of Quality

- *Performance* - main characteristics of the product/service
- *Aesthetics* - appearance, feel, smell, taste
- *Special features* - extra characteristics
- *Conformance* - how well product/service conforms to customer's expectations
- *Safety* - Risk of injury
- *Reliability* - consistency of performance

Dimensions of Quality

- *Durability* - useful life of the product/service
- *Perceived Quality* - indirect evaluation of quality (e.g. reputation)
- *Service after sale* - handling of customer complaints or checking on customer satisfaction

Examples of Quality Dimensions

Table 9-1

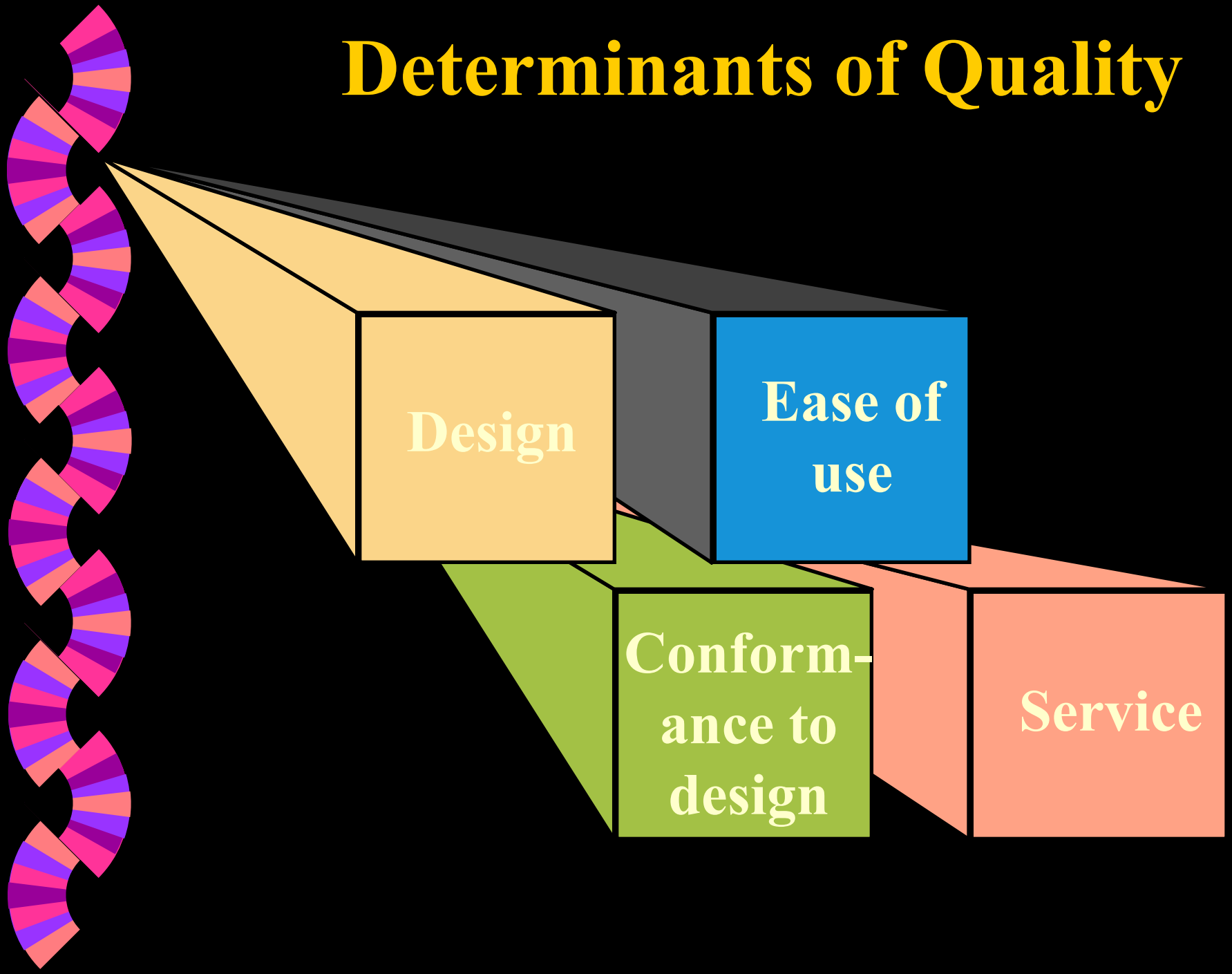
Dimension	(Product) Automobile	(Service) Auto Repair
1. Performance	Everything works, fit & finish Ride, handling, grade of materials used	All work done, at agreed price Friendliness, courtesy, Competency, quickness
2. Aesthetics	Interior design, soft touch	Clean work/waiting area
3. Special features Convenience High tech	Gauge/control placement Cellular phone, CD player	Location, call when ready Computer diagnostics
4. Safety	Antilock brakes, airbags	Separate waiting area

Examples of Quality Dimensions (Cont'd)

Table 9-1

Dimension	(Product) Automobile	(Service) Auto Repair
5. Reliability	Infrequency of breakdowns	Work done correctly, ready when promised
6. Durability	Useful life in miles, resistance to rust & corrosion	Work holds up over time
7. Perceived quality	Top-rated car	Award-winning service department
8. Service after sale	Handling of complaints and/or requests for information	Handling of complaints

Determinants of Quality



Quality Chain

- The sequence of activities (with people) that deliver the product or service. We can think of it as nodes where service or task is performed. In holiday vacation the chain starts with the brochure, booking, tickets, payment, traveling, resort, swimming pool, traveling back, feedback questionnaire.
- Contributors to the chain must be: aware, willing and inclined to action.

The Consequences of Poor Quality

- Loss of business
- Liability
- Productivity
- Costs

Responsibility for Quality

- Top management.
- Design.
- Procurement.
- Production/operations.
- Quality assurance

Responsibility for Quality

- Packaging and shipping.
- Marketing and sales.
- Customer service.

Scope of *Management System*

- The content, scope, processes and focus of a quality management system range across:
  - Design and conformance to design
  - Processes and transformation
  - availability and reliability
  - response, delivery and logistics
  - accuracy, completeness and maintainability
  - cost effectiveness
  - consumption feelings, after-glow and after care
  - quality control inspections and testing
  - the quality manual and control document
  - audit and certification expectations

Quality policy

- It is a statement that guide the practices and behaviors essential for quality achievement throughout the system as a whole. The policy has to be properly and consistently implemented by all concerned. The quality policy must include:
- The organization structure for quality: roles, responsibilities - general and specialist.
- How client/customer needs and perceptions will be identified.

Elements of Quality Policy

- How the organization will gear itself up to meet customer needs - technically and economically.
- The elements and operation of the quality management system.
- How suppliers and supplies will be required to meet performance and efficiency standards

Elements of Quality Policy

- How a prevention and continuous quality improvement approach will be emphasized and implemented over an "inspect-out" approach.
- How communication, knowledge, information and staff development will feature in the organization's quality efforts.
- How quality management systems themselves will be reviewed to ensure they are working effectively

Quality Quality Policy Statement

- Every member of the business shares the responsibility for quality and quality improvement.

- Company managers through their own practices and standards will endeavour to lead by example. They will give complete commitment and allocate the necessary resources to the quality policies and programmes that are initiated.
- Everyone has the scope to contribute to continuous quality improvement. Those taking initiatives will generate effective conditions for staff to participate creatively in the design, implementation and review of improvement activities.
- We will compare our own performances with those of competitors and leaders in other sectors. The benchmark data will be shared with staff in all relevant sections of the business.
- Our quality management approach and its operation will enable the company to obtain and maintain ISO 9000 accreditation.

Quality Policy Statement

- Quality processes and controls will implemented in a systematic and planned way across the business and given consistent and thorough attention. Specialist quality management roles and systems will be clearly defined and reviewed regularly .
- To be committed to quality processes and outcomes the focus must be on "getting it right first time" rather than "inspecting poor quality out " (when the poor quality has already occurred). Our aim is to delight our customers and develop the best operational relationships with our suppliers - external and internal.

Quality Policy Statement

- The quality of support, interaction and achievement at every point in our supply chain is highly significant to success. Wherever practicable we will work in partnership with our suppliers, external and internal, as a natural adjunct to the quality policy.
- Information, communication, education and training have leading roles to play in the implementation of the quality policy. To ensure that everyone is empowered to contribute, the policy, its practices and programmes will be disseminated and promoted widely internally and externally using a range of methods and media.

Quality Policy Statement

- Assistance will be given to support the learning, education and training needs of staff at all levels so that they possess the competences and know-how: technical and social, for their role within the quality policy.
- Implementation of the quality policy will be a specific and high priority agenda item for all management meetings and company briefings

Costs of Quality

- Failure Costs - costs incurred by defective parts/products or faulty services.
- Internal Failure Costs
  - Costs incurred to fix problems that are detected before the product/service is delivered to the customer.
- External Failure Costs
  - All costs incurred to fix problems that are detected after the product/service is delivered to the customer.

Costs of Quality (continued)

- Appraisal Costs
  - All product and/or service inspection costs.
- Prevention Costs
  - All TQ training, TQ planning, customer assessment, process control, and quality improvement costs to prevent defects from occurring

Ethics and Quality

- Substandard work
  - Defective products
  - Substandard service
  - Poor designs
  - Shoddy workmanship
  - Substandard parts and materials

Having knowledge of this and failing to correct and report it in a timely manner is unethical.

Quality Control Versus Quality Assurance and continuous improvement

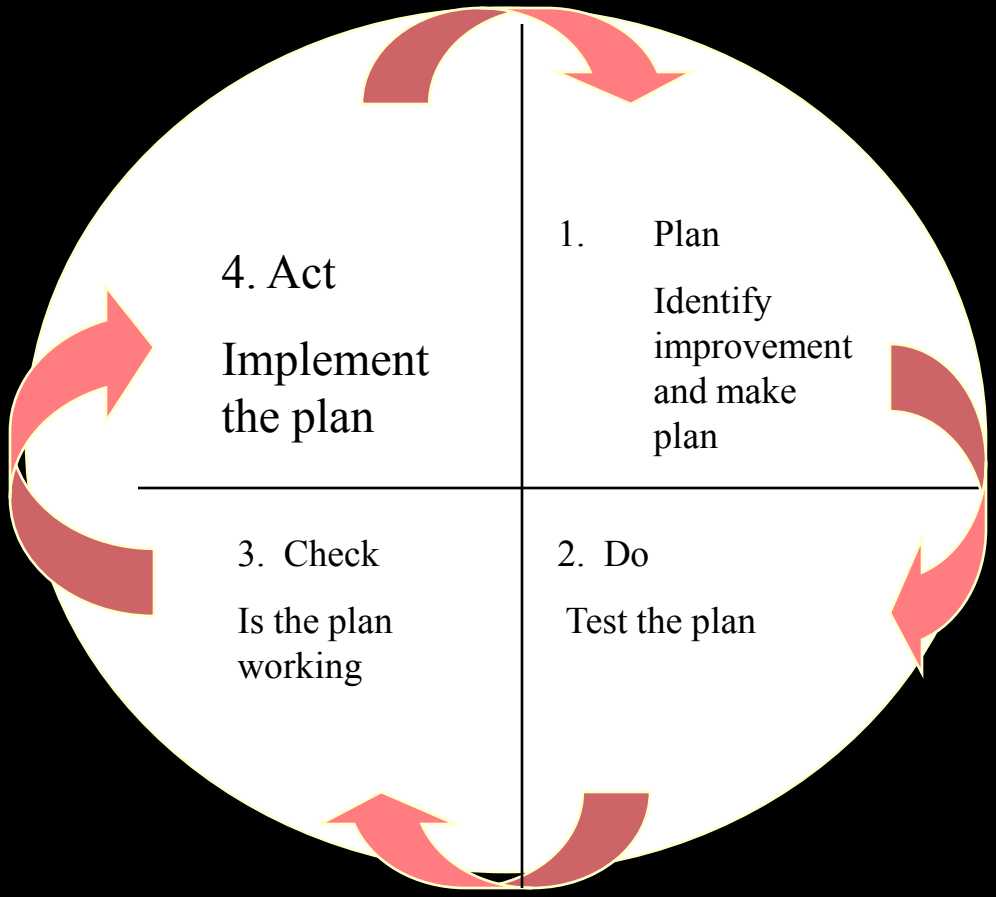
- Quality control is a process that evaluates output relative to a standard and takes corrective action when output des not meet the standard.

- Quality assurance QA requires a structured approach to prevention of quality problems through planned and systematic activities: specification,review, monitoring and documentation.QA demands a quality management system.

Quality Control Versus Quality Assurance and continuous improvement

- Continuous improvement is a never ending process of continuous improvement that covers people, equipment, suppliers, material, processes and procedures. Japanese call (Kaizen).
- Shewhart developed a circular model known as PDCA (plan, do, check,act)

PDCA Cycle
Known as Deming Cycle



Quality control Techniques

- Inspection plans (product control)
- Magnificent seven tools (process control)
- Others (Optimization)

Phases of Quality Assurance

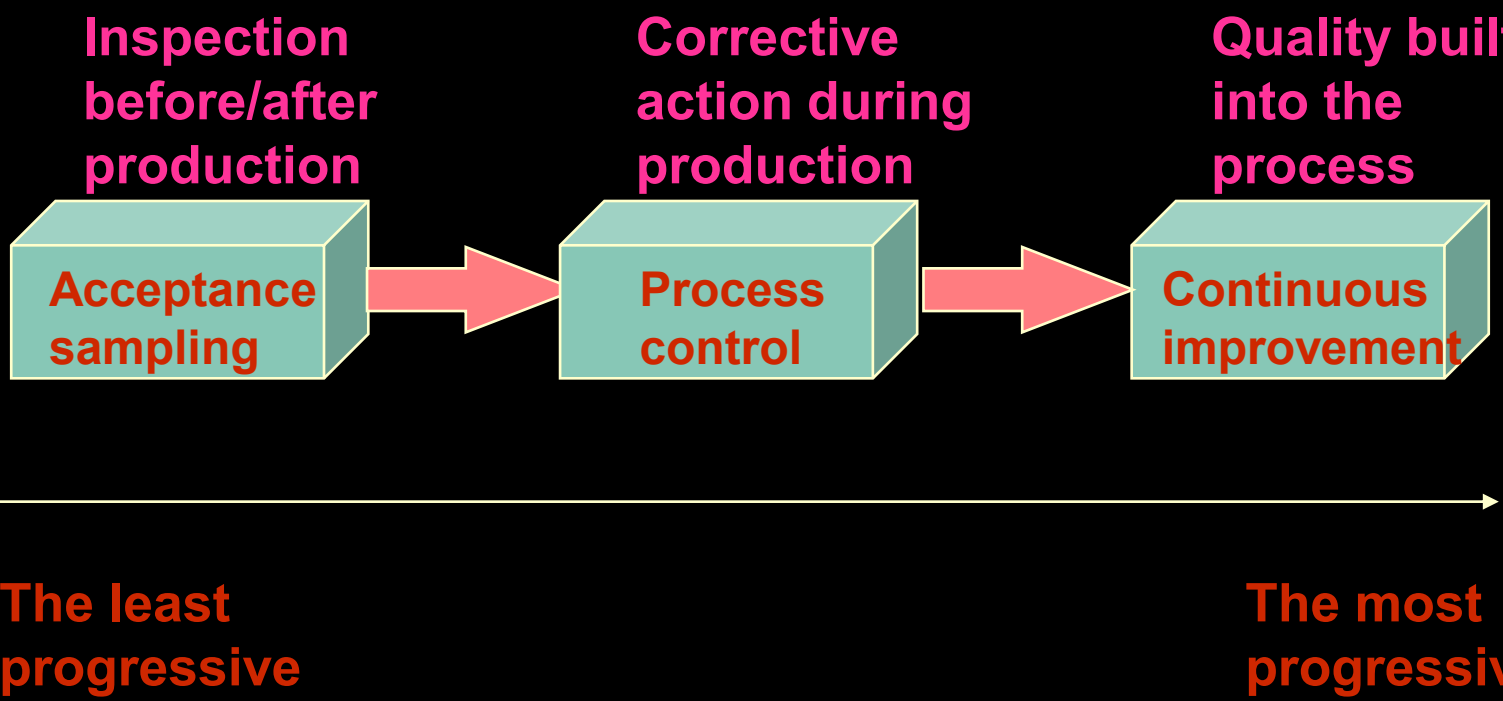


Figure 10-1

Inspection

- How Much/How Often
- Where/When
- Centralized vs. On-site

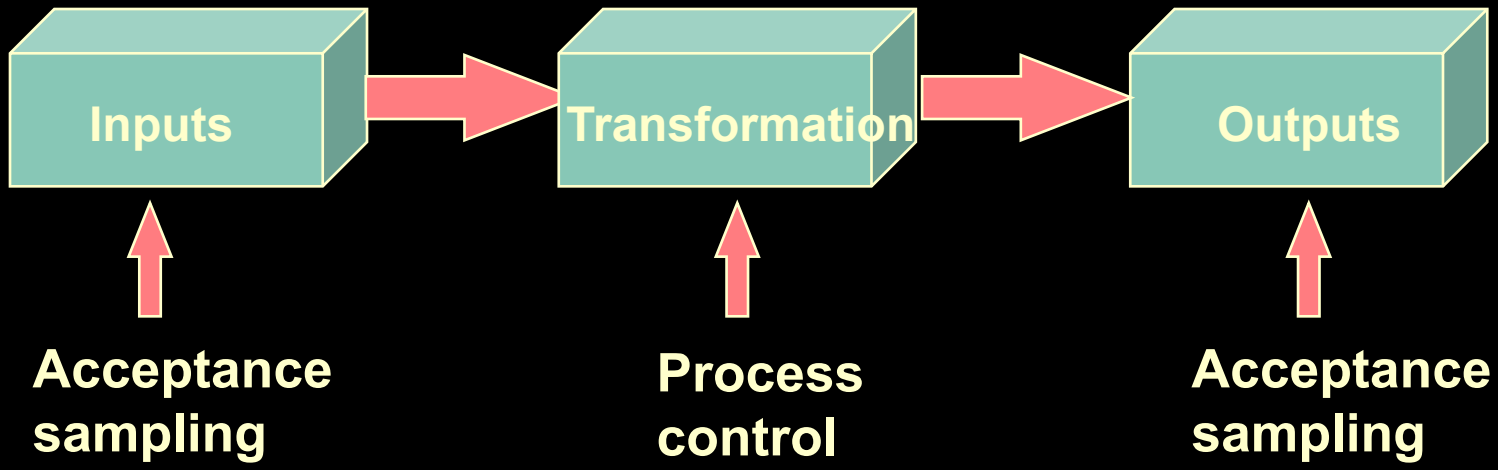


Figure 10-2

Inspection Costs

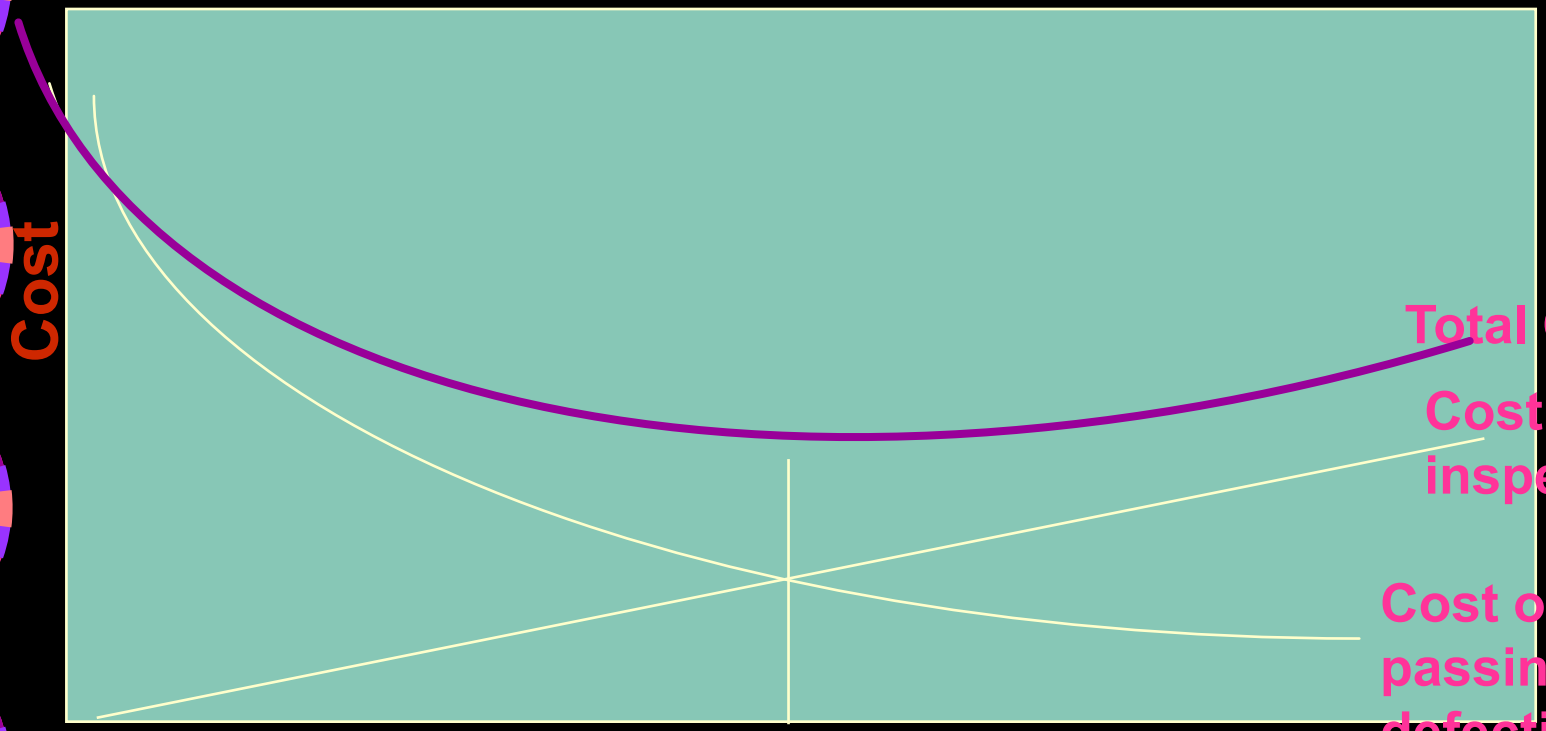


Figure 10-3

Where to Inspect in the Process

- Raw materials and purchased parts
- Finished products
- Before a costly operation
- Before an irreversible process
- Before a covering process

Examples of Inspection Points

Type of business	Inspection points	Characteristics
Fast Food	Cashier	Accuracy
	Counter area	Appearance, productivity
	Eating area	Cleanliness
	Building	Appearance
	Kitchen	Health regulations
Hotel/motel	Parking lot	Safe, well lighted
	Accounting	Accuracy, timeliness
	Building	Appearance, safety
	Main desk	Waiting times
Supermarket	Cashiers	Accuracy, courtesy
	Deliveries	Quality, quantity

Table 10-1

Seven Magnificent SPS Tools

- Check sheets
- Histogram
- Pareto chart
- Cause and effect diagram
- Defect concentration diagram
- Control charts
- Scatter diagram

Check Sheets

- A check list is a set of instructions, prepared in a simple manner, to aid in data collection, so data can be compiled, easily used, and analyzed automatically. It can be used for:
  - Check defects causes
  - Machine diagnosis
  - Reviewing sequence of tasks
  - Job steps
  - etc.

	Check the column that indicates the condition of the unit										
Number of major components	Items	Good Condition	Requires cleaning	Requires adjustment	Requires lubrication	Examine vibration	Examine heat	Loose	Requires overhaul	Requires replacement	See additional comments
1	Electric motor										
	1.1 Bearing										
	1.2 Base and bolts										
	1.3 Temperature										
	1.4 Vibration										
	1.5 Noise										
2	Coupling										
	2.1 Alignment										
	2.2 Lubrication										
3	Generator										
	3.1 All electric motor										
	3.2 Armature										
	3.3 Brushes										
	3.4 Rotor										

Figure 1

No.	Major process operation	Tasks	Time in	Time out	Time of** non-regular breaks
1.	Review work scope	1.1 Review work			
2.	Setup, check run-out	2.1 Check			
		2.2 steady rest			
		2.3 Check run out.			
		2.4 Check run out			
3.	Premachining	3.1 Premachining			
		3.2 Seam cleaning			
4.	Plasma or HVOF spray	4.1 Preheating in oven			
		4.2 Fixing shimms			
		4.3 Gritting			
		4.4 Pre heating using gun			
		4.5 Spraying			
		4.6 Cooling down			
5.	Brush spray	5.1 Preparation			
		5.2 Platting			
		5.3 Final machining			
6.	Metal spray	6.1 Preheating			
		6.2 Spraying			
		6.3 Final machining			
7.	Grinding	7.1 Grind			
8.	Probe tracking	8.1 Grind			
		8.2 Brushing			
		8.3 Measuring and taking photos			

Figure 2

Physician:_____			Date:_____
Patient:_____			Age:_____
Circle of required test	Test	Result	Normal values
1.	Ure N		7-50 Mg/dL
2.	Glucose Fasting		60-110 Mg/dL
3.	Uric Acid		2-7 Mg/dL
4.	Creatinine		0.05-1.5 Mg/dL
5.	Amylase		45-200 Mg/dL
6.	Sodium		136-144 mEq/L
7.	Potassium		4-4.5 mEq/L
8.	Chloride		95-105 mEq/L
9.	CO_2		23-30 mM/l
10.	Calcium		8.5-10.4 Mg/dL
11.	Cholesterol		128-200 Mg/dL
12.	Triglyceride		33-210 Mg/dL
13.	Laclate dehydrogenase (LHD)		65-115 Mg/dL
14.	High density lipoprotein (HDL)		
15.	Acid phosphate		Less 1.0 I.U
16.	Serum protien		6-8 GM/dL
17.	Serum albumin		3.5-5.0 GM/dL
18.	Serum globulin		23-35 GM/dL

Figure 3

Work sampling check sheet

Checker: _____ Object of check: _____ Date:_____

Method:_____ weather: _____

Item	Checks	Total	%
Processing	## ## // --------	300	60%
Planning	## ## // ----------	125	25%
Transport	## // ----------	50	10%
Break-down	## ## /	20	4%
Others	## //	5	1%
Total		500	100%

Figure 4

Histogram

- A histogram is a of a bar chart representing the frequency of an entire data grouped into evenly spaced category. It can be viewed as a graph of class versus frequency. It used for the following:
  - Organizing data.
  - Spotting variation in data.
  - Identifying data distribution.

Frequency Distribution

Let us examine the following data for the demand in weeks for the last 30 orders of computers/drug.

15 6 21 15 12
9 18 6 9 9
18 6 12 15 3
21 6 18 12 9
15 9 6 18 12
12 6 18 12 12

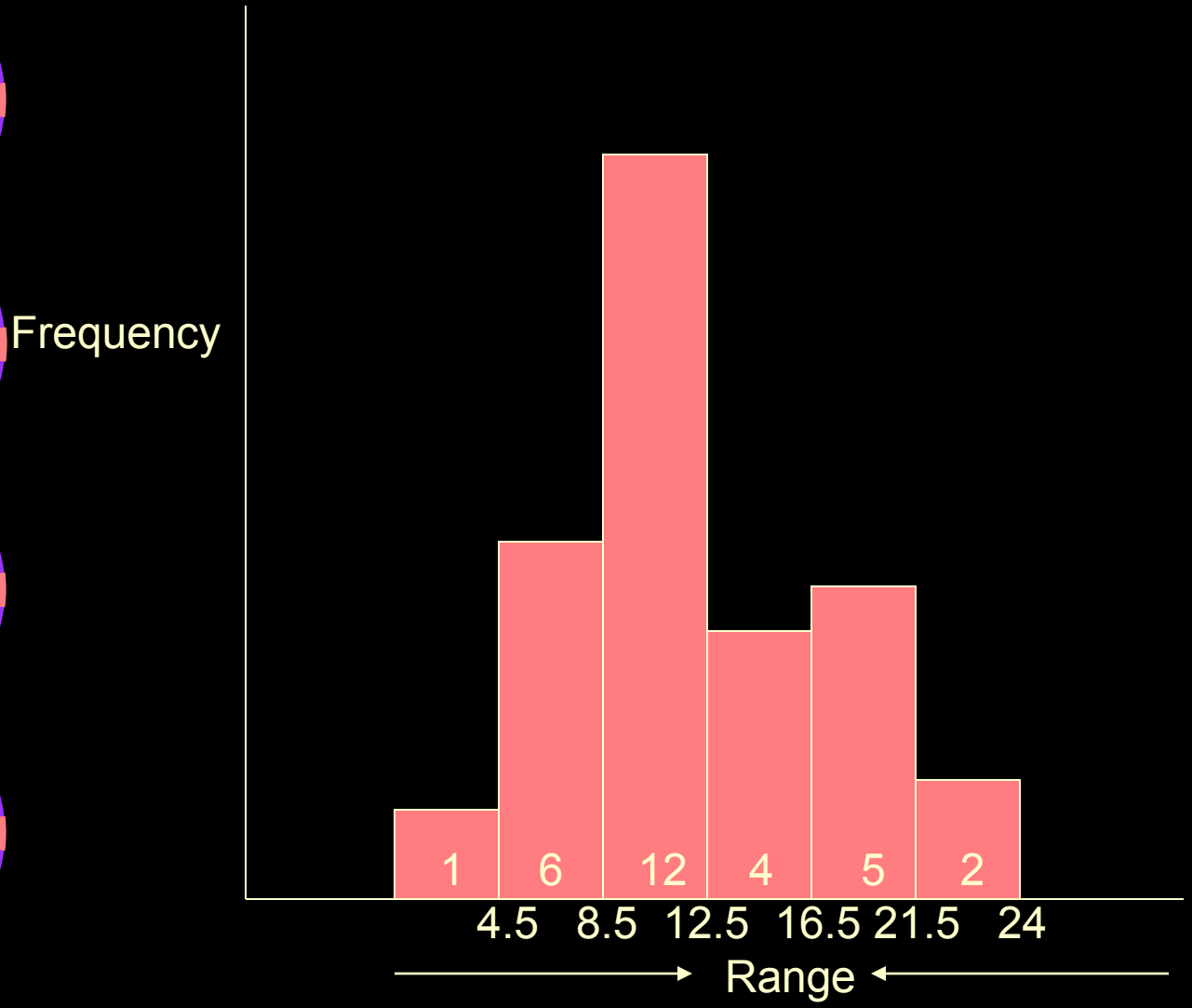
$n = 30$

Frequency Distribution

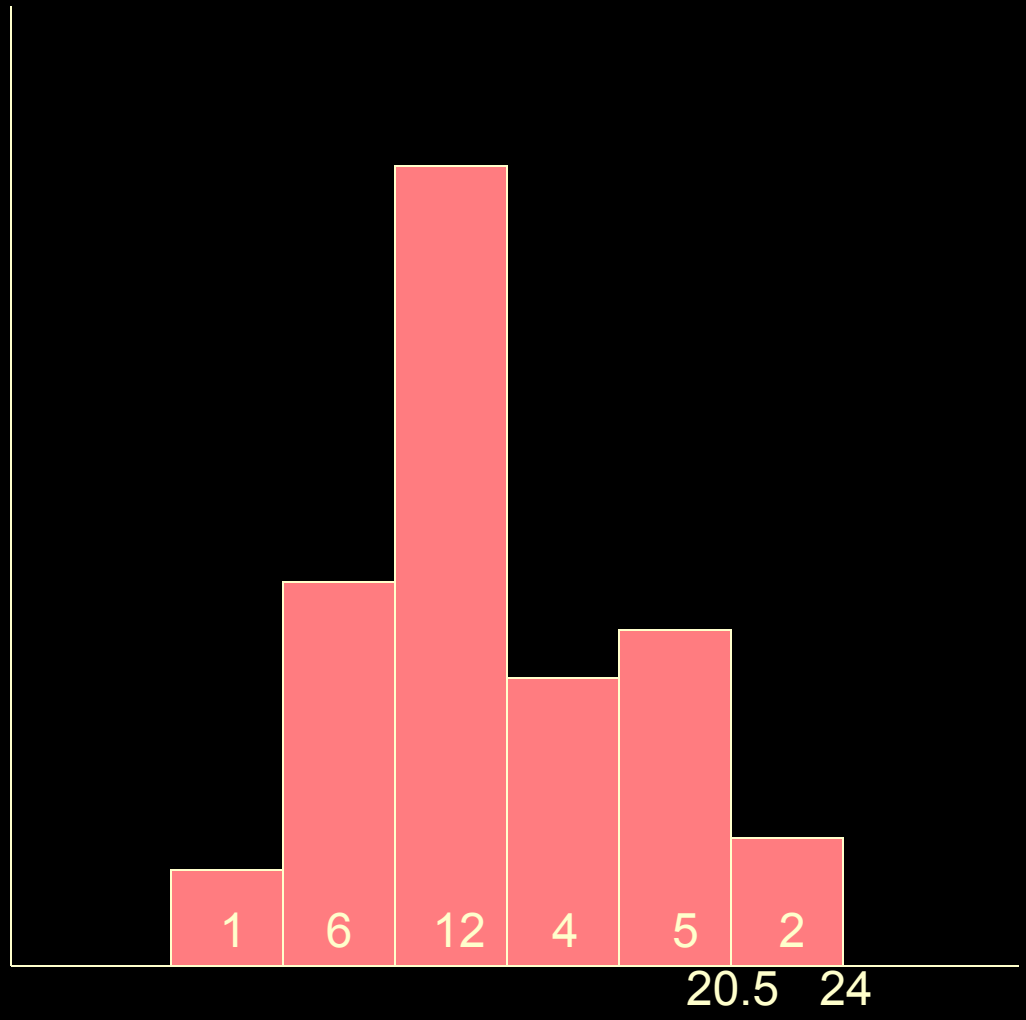
The Frequency Dist. Is Table that provide classes and frequency (number of occurrences in the class). For the demand data it is

No.	Class	Frequency	
1	1 – 4	|	1
2	5 – 8	|||||	6
3	9 – 12	||||||||||	12
4	13 – 16	|||	4
5	17 – 20	||||	5
6	21 – 24	||	2
			30

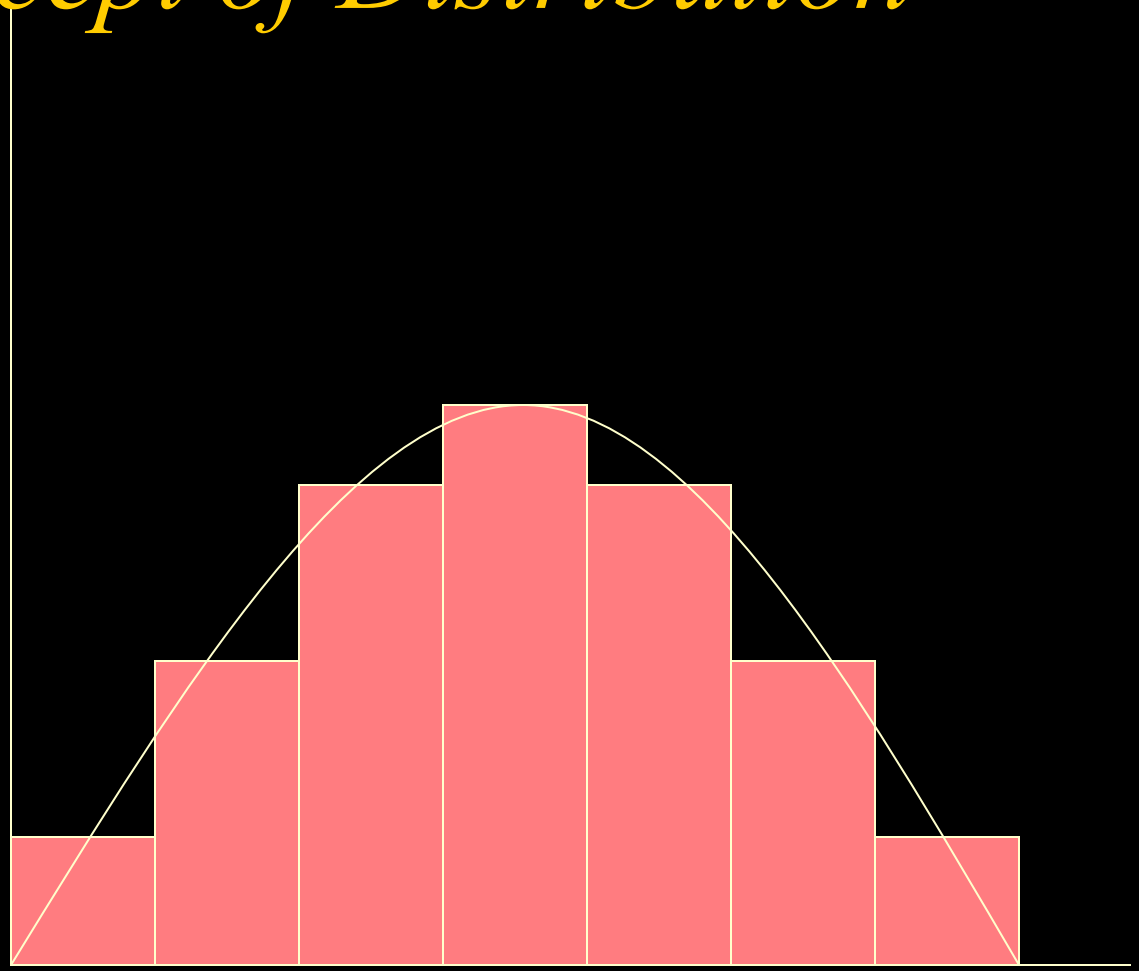
The graph of class versus frequency called Histogram



Percentiles

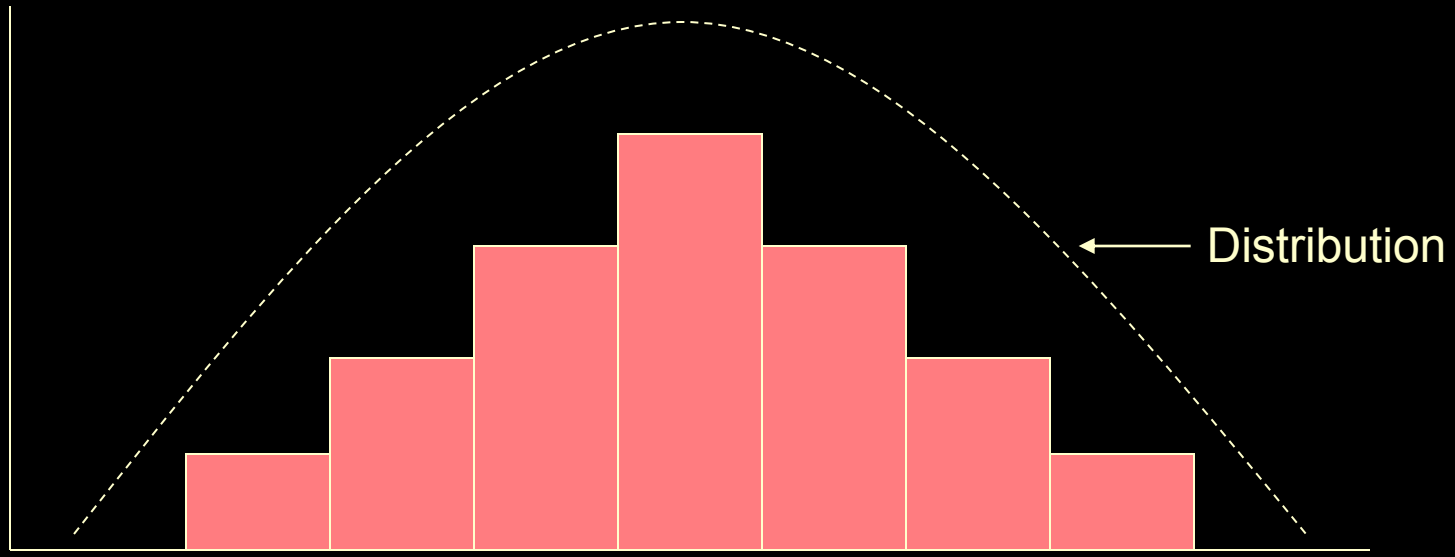


Concept of Distribution



Histogram Shapes

- While the number of shapes that a histogram ca take is unlimited, certain shapes appear often then others.
- Drawing a line that connects the edges of the bars in a Histogram forms a curve. We can make certain inferences about the data from the shape of the curve.



Histogram Question

- Does the shape of the histogram tells something?
- If the answer is yes how?
- How do we assess variability from the histogram?

Pareto Chart

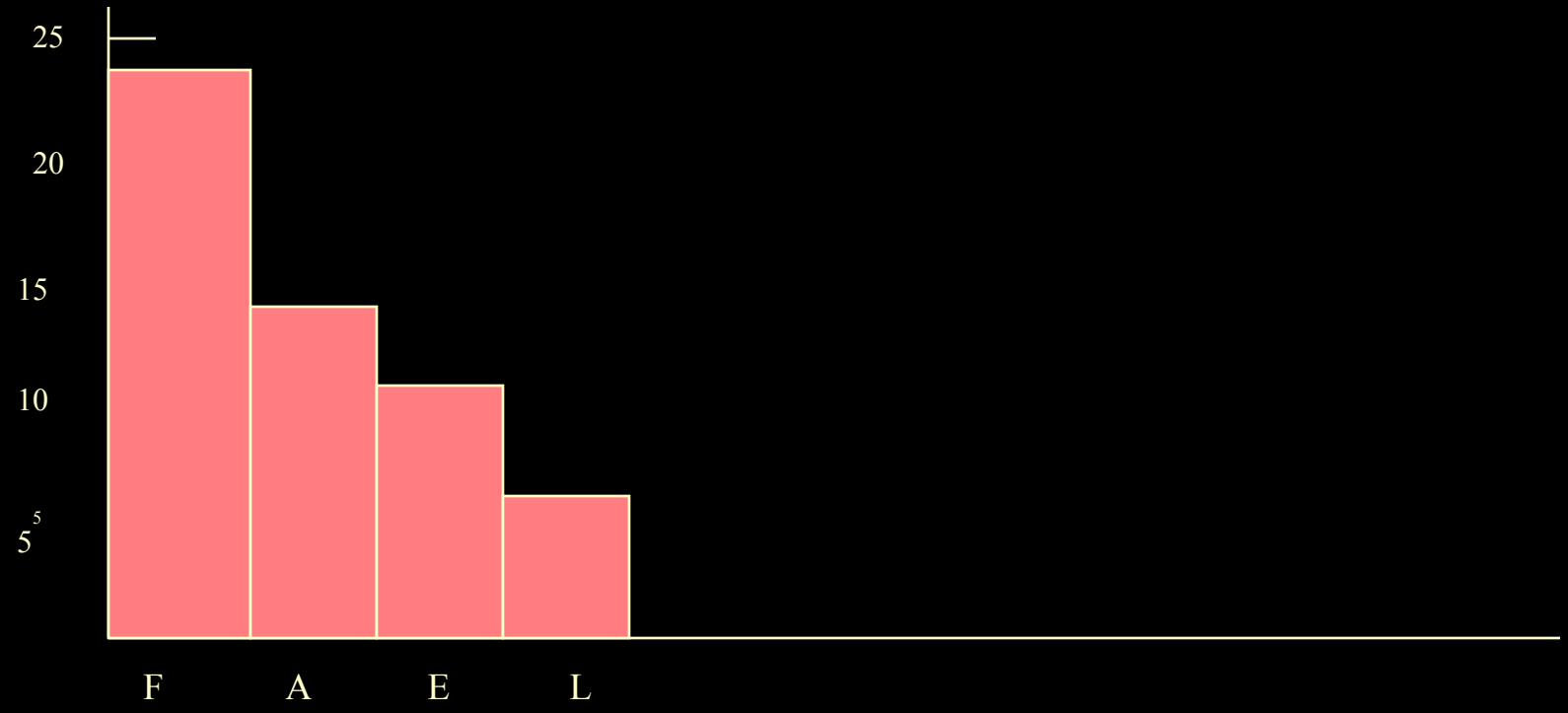
- Pareto chart/diagram is a bar chart that categories possible causes of problem areas and organize them in order of decreasing frequency/cost/impact. It is a problem solving tool used to separate the "Major" few from the trivial "many". It can be used for:
  - Identify important causes for bad quality
  - Prioritizing allocation of resources.

Example on Pareto Chart

- Below is a check sheet that lists type of injury in a factor

Type of injury		Tally	Frequency
Fingers	(F)	𝍸 𝍸 𝍸 𝍸 111	23
Eyes	(E)	𝍸 1111	9
Arms	(A)	𝍸 𝍸 111	13
Legs	(L)	𝍸	5
Total			50

Pareto Chart



Pareto Chart Uses

- Identifying major quality problems
- Identifying major unsafe acts
- Identify major causes of budget over run
- Identify major costs factors in a process
- Identify major reasons for not meeting targets..
- Many others.

Cause and Effect Diagram

- It is a chart that relates the problem to its causes.
- It's objective is to identify causes of a problem
- It is useful in sorting, interrelating and visualizing the causal factors influencing a particular problem

Cause-and-Effect Diagram

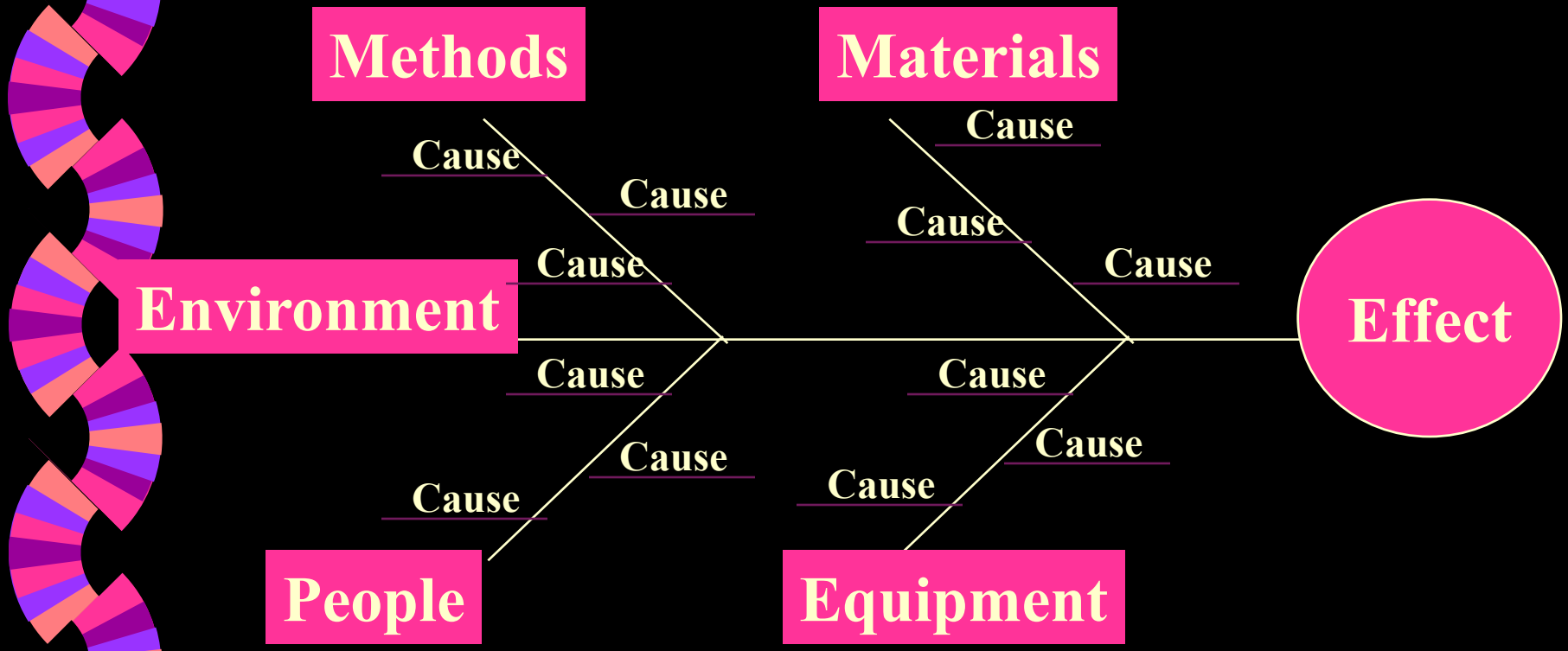
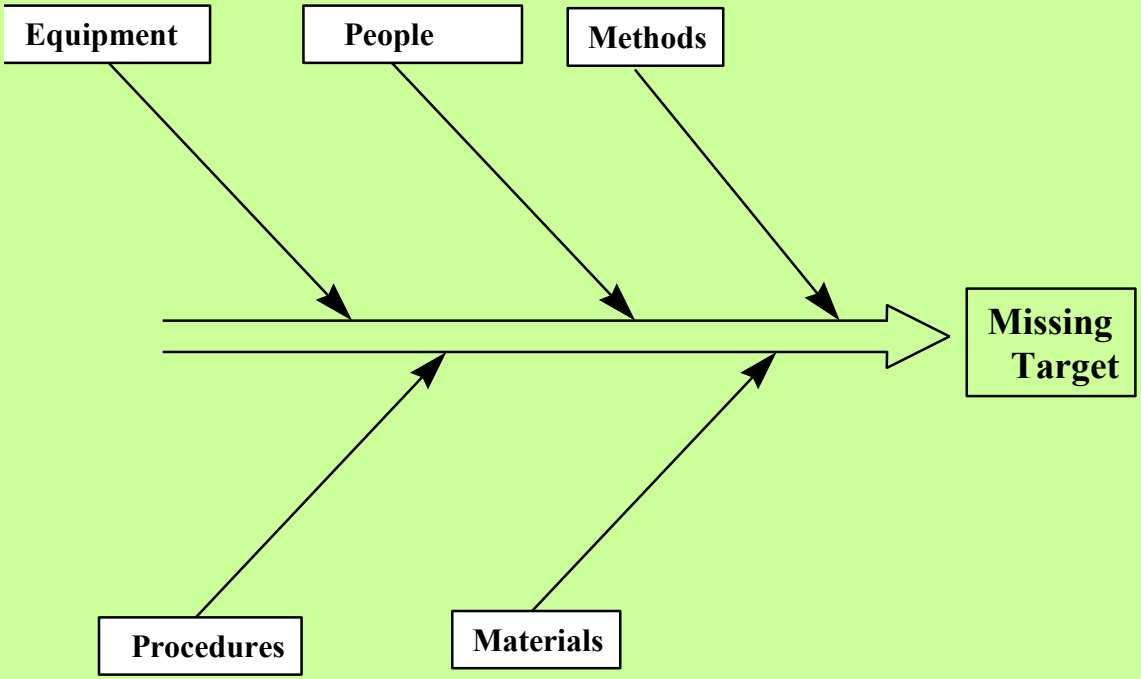


Figure11-10 in text

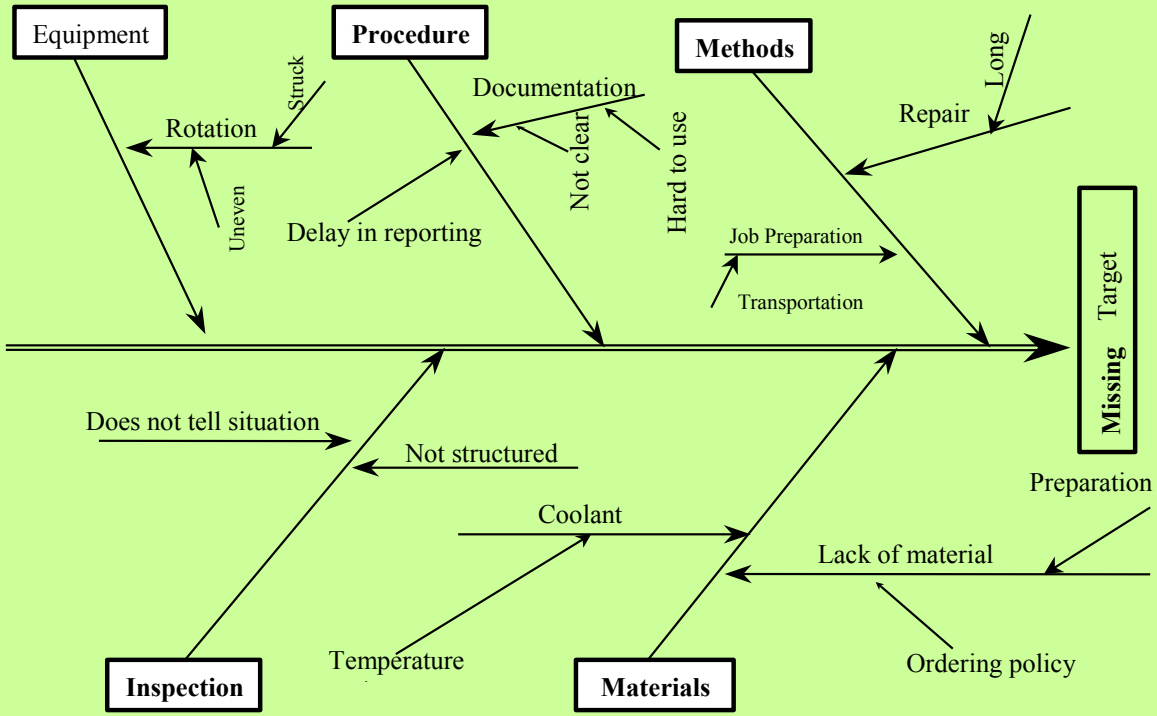
Figure 6

The steps of the CED are:

- Decide the quality characteristic, and effect needed to be studied. This is usually a phenomena (effect) we need to improve and control. As an example not meeting production targets. (next Figure)
- Write the effect on the right side. Draw a broad arrow from the left side to the right side
- Write the main factors which may be causing the target miss, directing a branch arrow to the main arrow (Figure 7). Group the major possible causes into categories such as materials, equipment, methods of work, and measuring methods. Each category will form a branch as in the next Figure.


Equipment
People
Methods
Missing Target
Procedures
Materials

- Write on each of the side branches the detailed factors which may be regarded as the causes. These will be like twigs and on these write more detailed factors and so on. (see next figure)
- Check to make sure that all causes are included in the diagram and the relationships are properly illustrated.


Equipment
Procedure
Methods
Rotation
Struck
Uneven
Documentation
Not clear
Hard to use
Delay in reporting
Repair
Long
Job Preparation
Transportation
Missing Target
Preparation
Does not tell situation
Not structured
Coolant
Lack of material
Inspection
Temperature
Materials
Ordering policy

Concepts of Variation

- Variations and Control
  - Random variation: Natural variations in the output of process, created by countless minor factors
  - Assignable variation: A variation whose source can be identified

Control Charts

- Control charts is a graphical representation of the natural (random) and unnatural variation of a process. It can provide a rational basis to determine when to adjust a process and when to leave a capable process alone.
- A statistical chart of time-ordered statistics

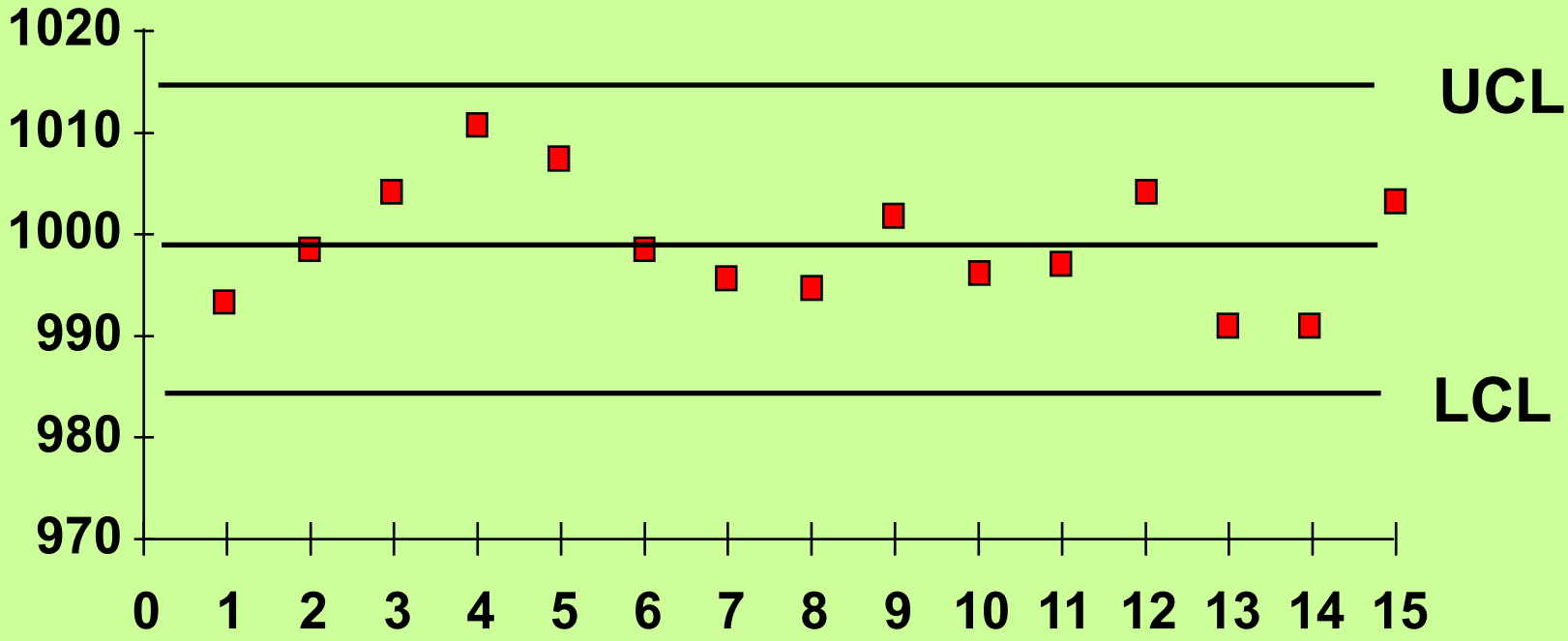
Uses of Control Charts

- Monitor processes
- Detect the presence of correctable causes of variation.
- Meet specifications
- Tell if a process is capable

Types of Control Charts

- Control charts for variable.
- Control chart for attributes
  - P-chart
  - C-chart

Control Chart



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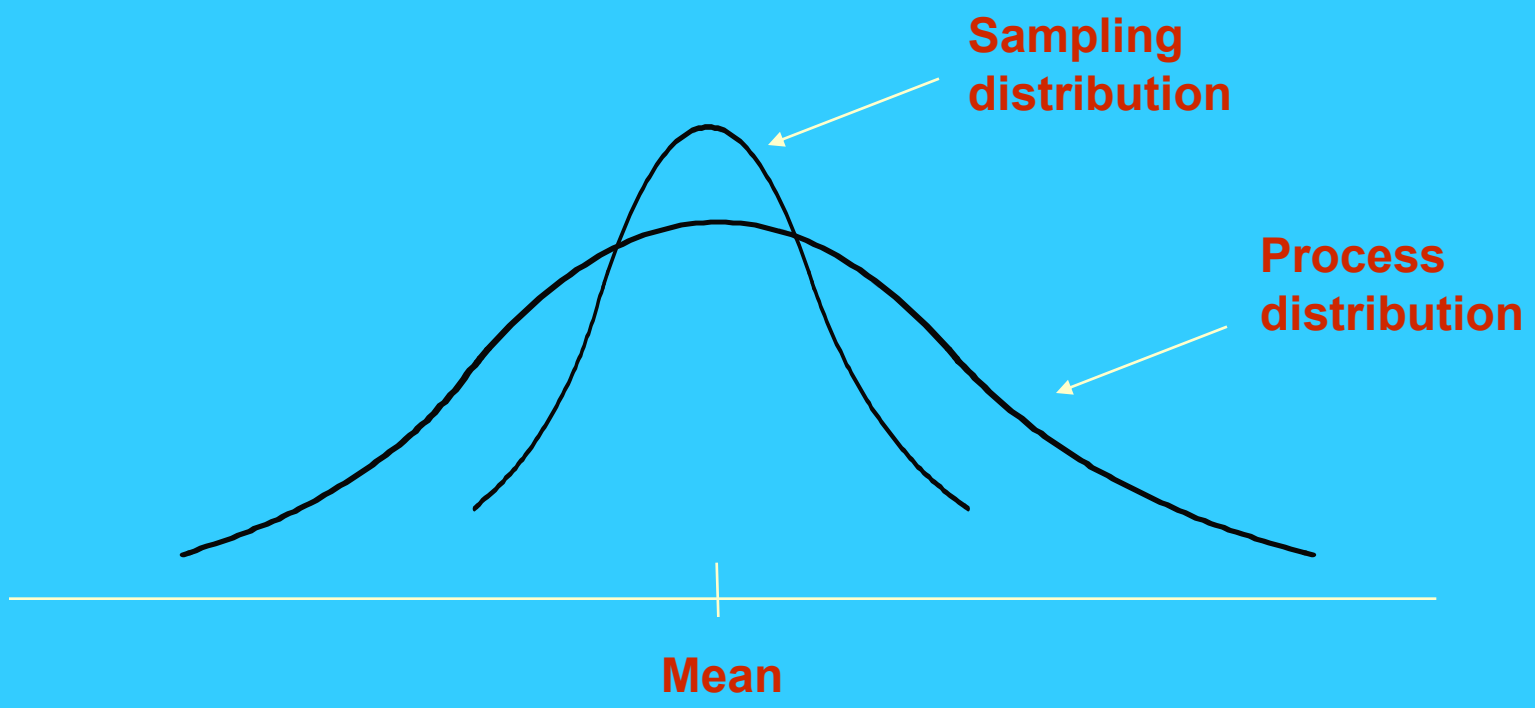
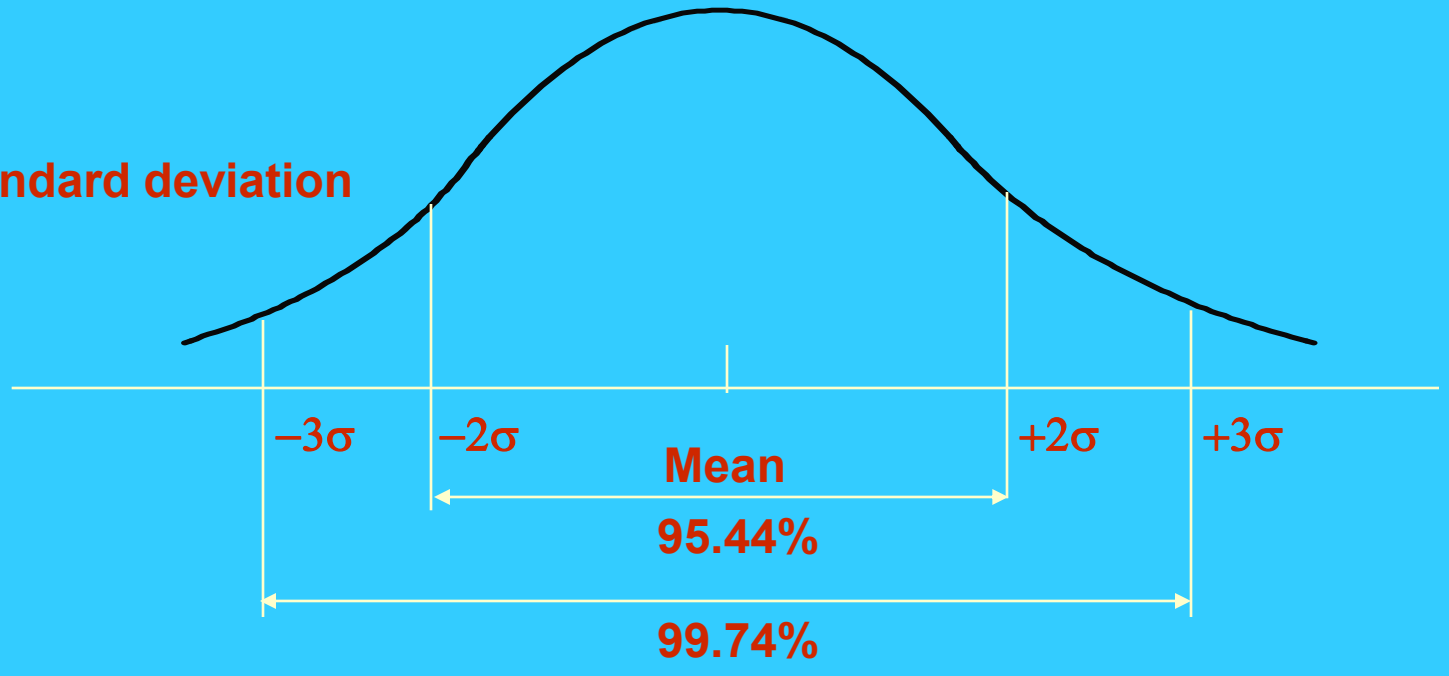
Sampling Distribution

Figure 10-4



Normal Distribution

Figure 10-5



Control Limits

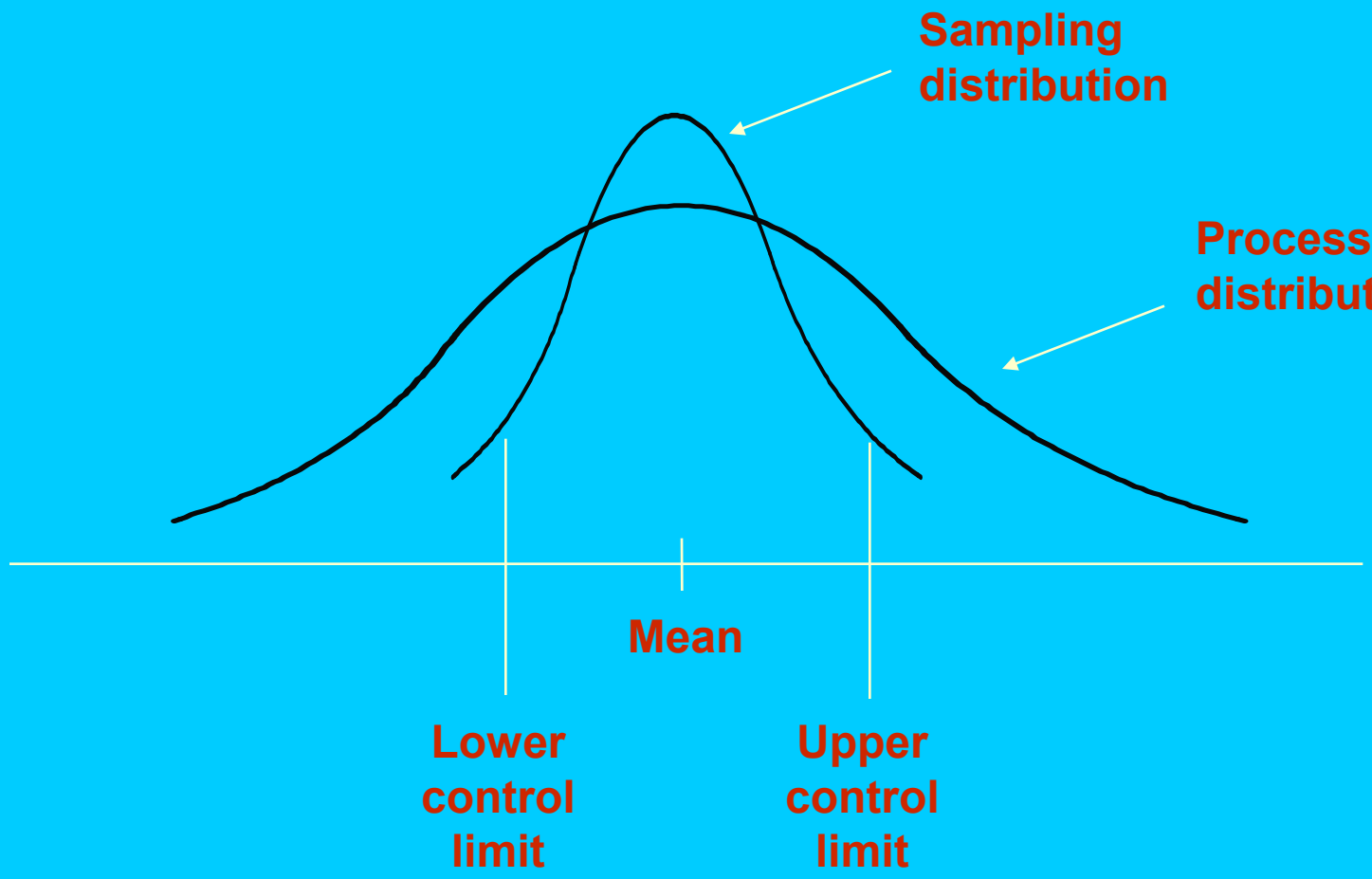
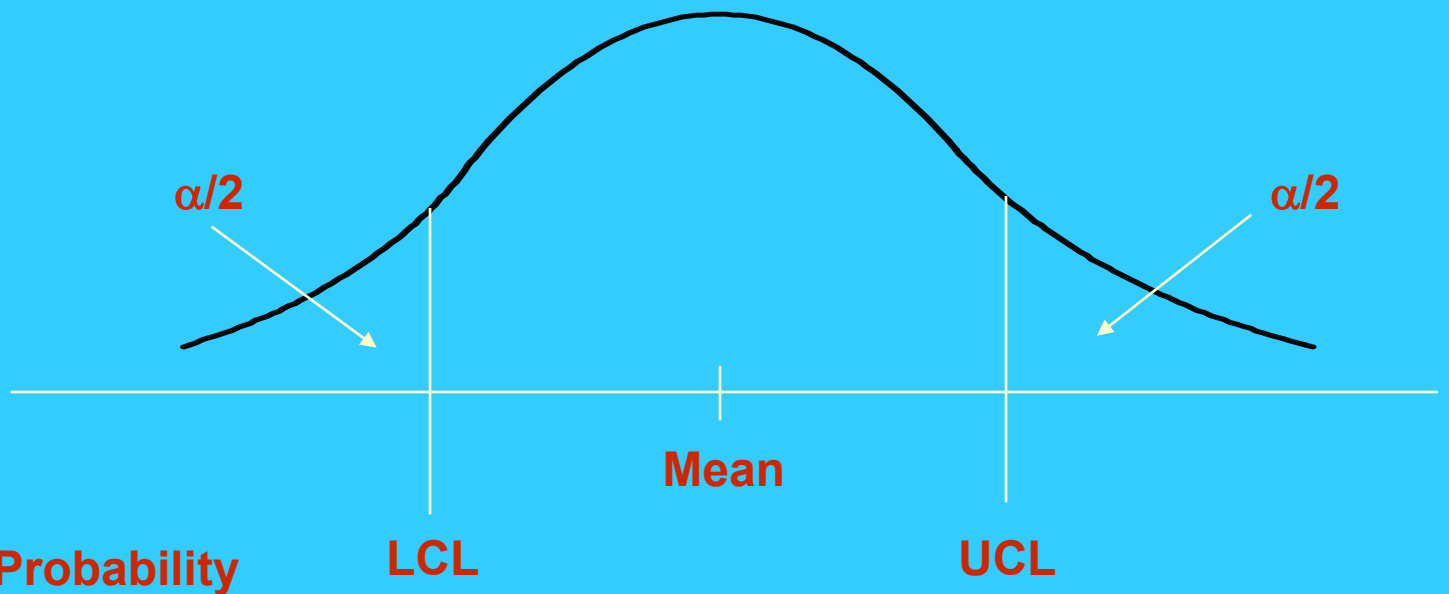


Figure 10-6

Type I Error



α = Probability of Type I error

Figure 10-7

Control Chart

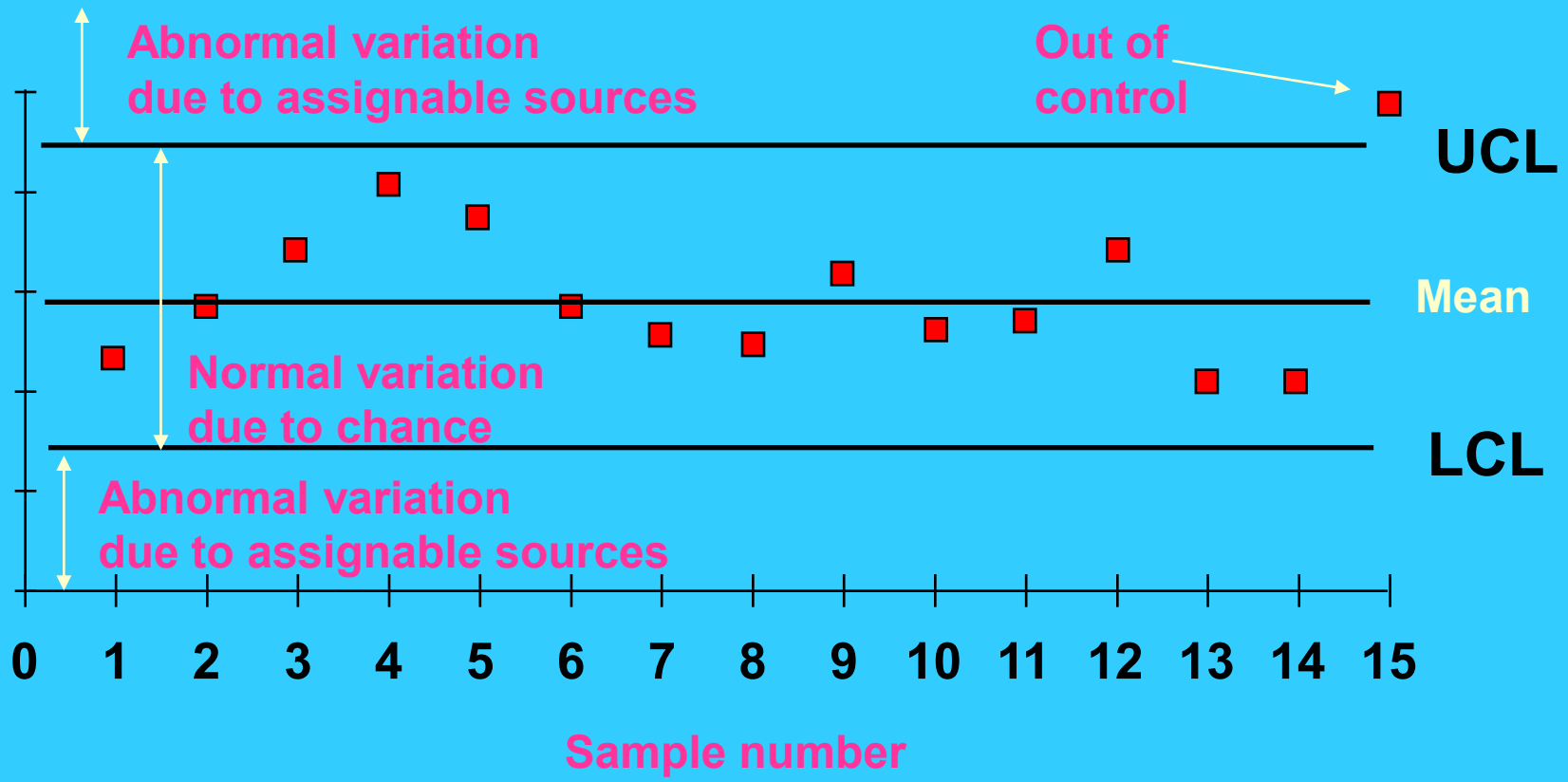


Figure 10-8

Observations from Sample Distribution

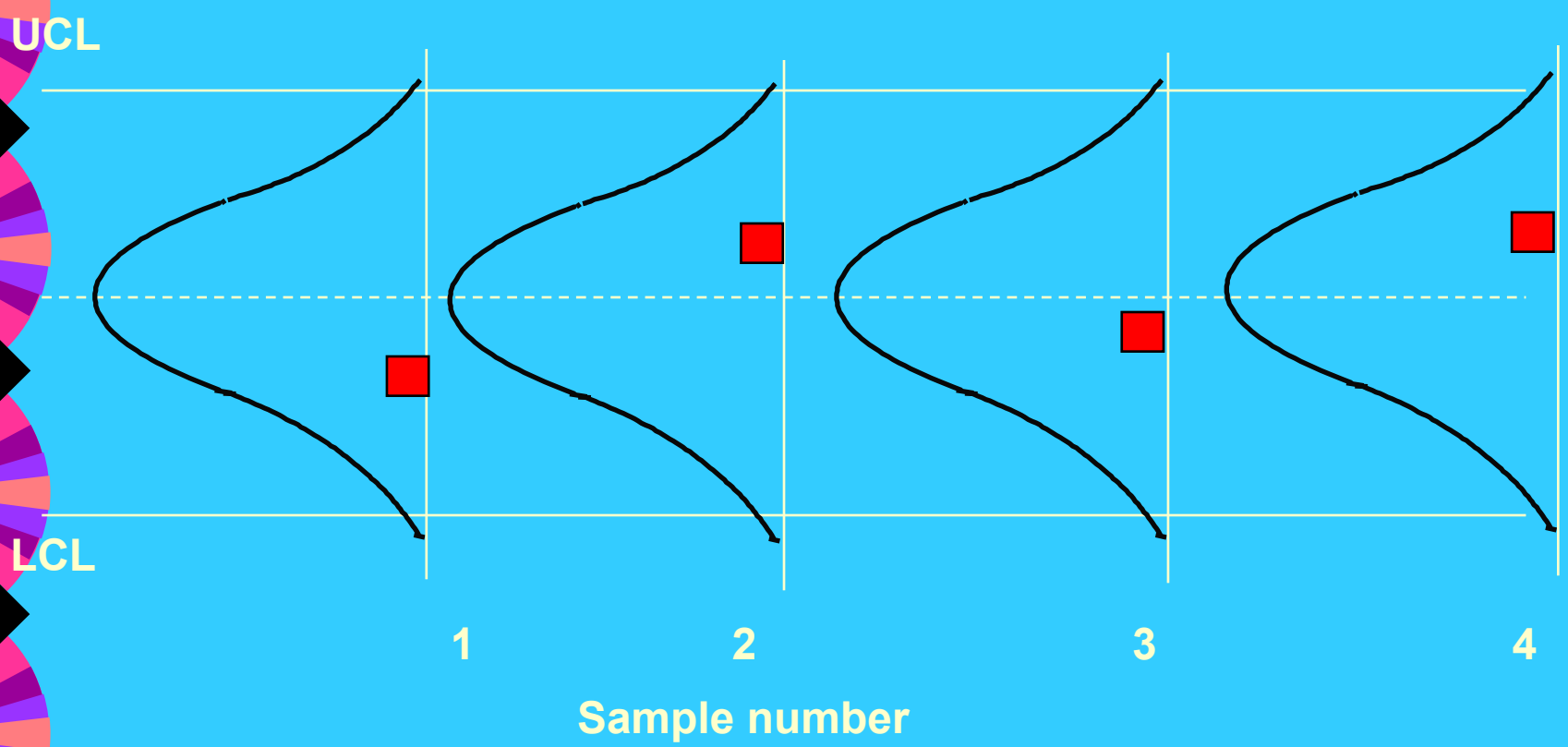
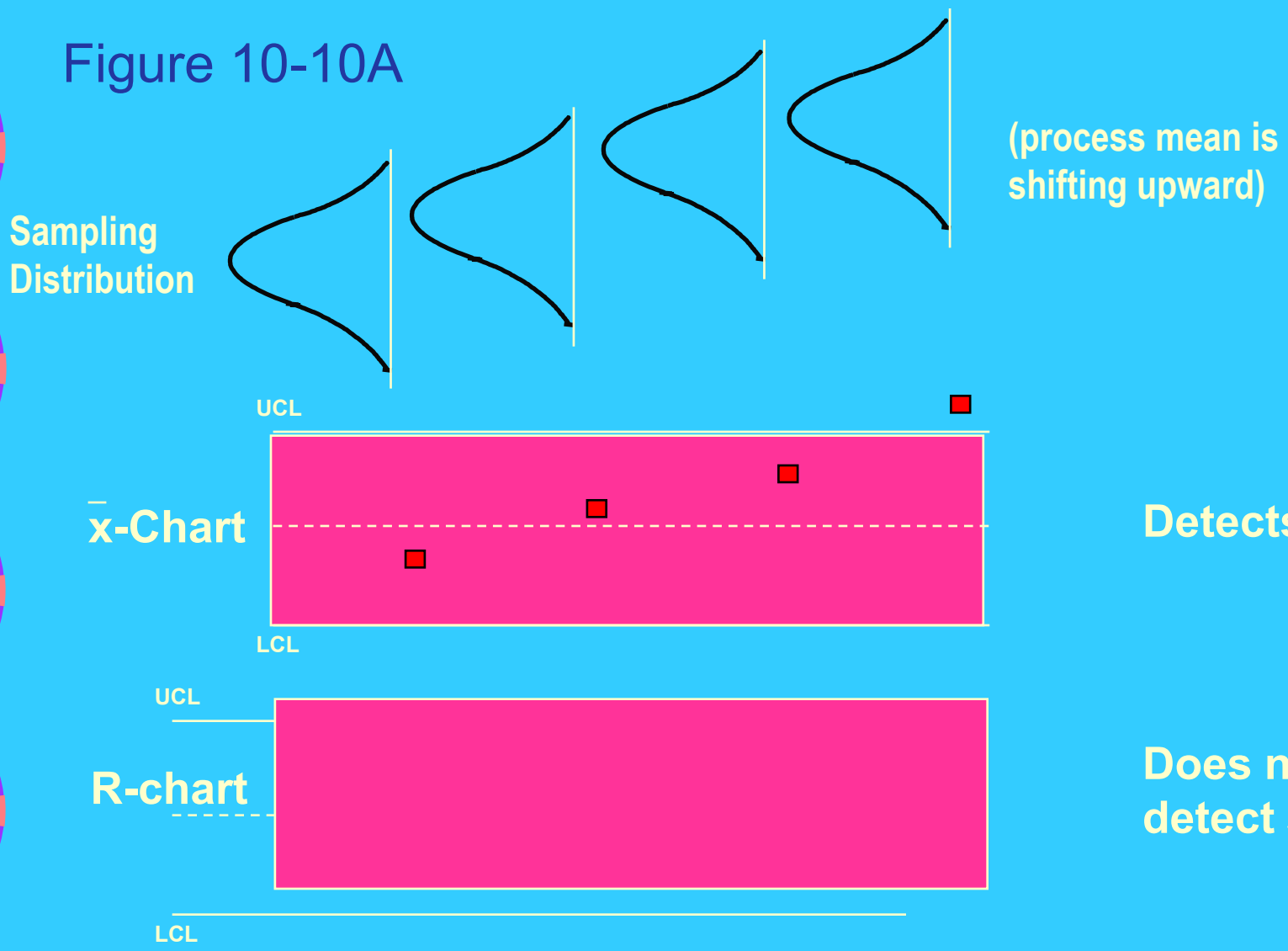


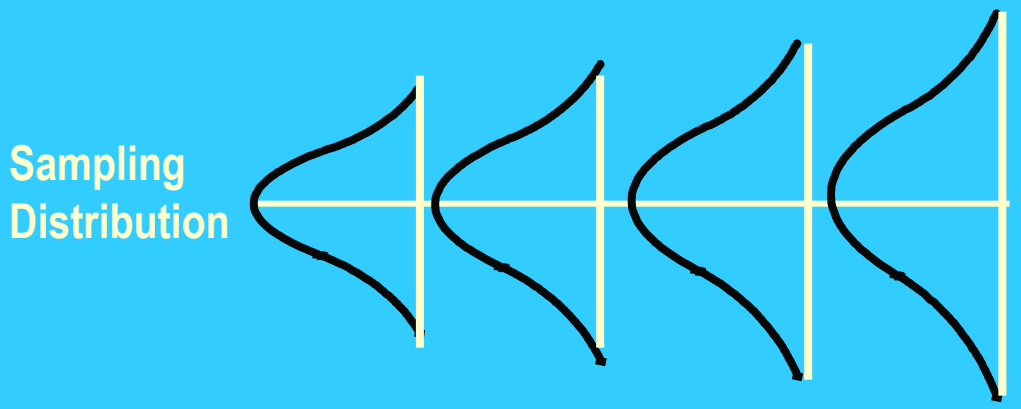
Figure 10-9

Mean and Range Charts

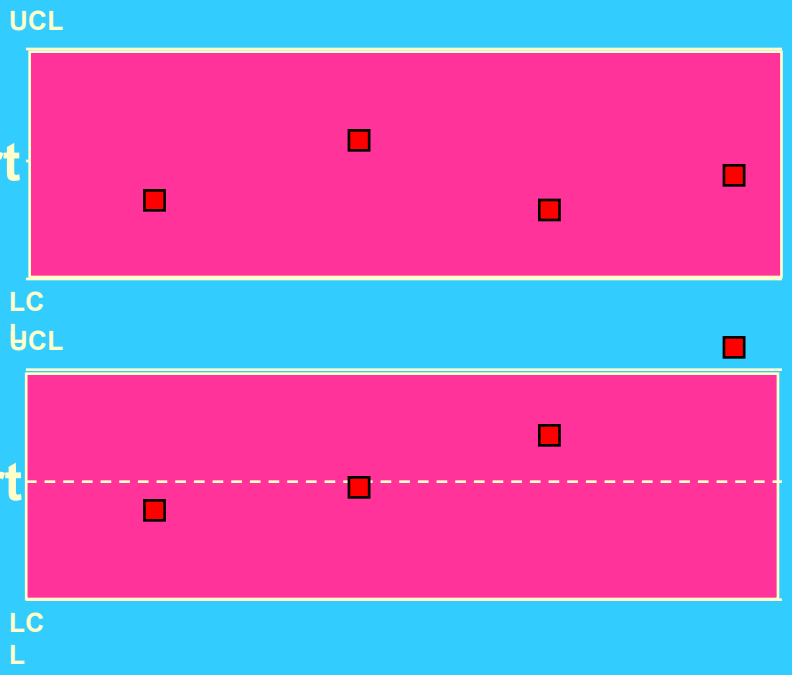
Figure 10-10A



Mean and Range Charts



(process variability is increasing)



Does not reveal increase

Reveals increase

Figure 10-10B

Control Chart for Attributes

- p-Chart - Control chart used to monitor the proportion of defectives in a process
- c-Chart - Control chart used to monitor the number of defects per unit

Use of p-Charts

- When observations can be placed into two categories.
  - Good or bad
  - Pass or fail
  - Operate or don't operate
- When the data consists of multiple samples of several observations each

Table 10-3

Use of c-Charts

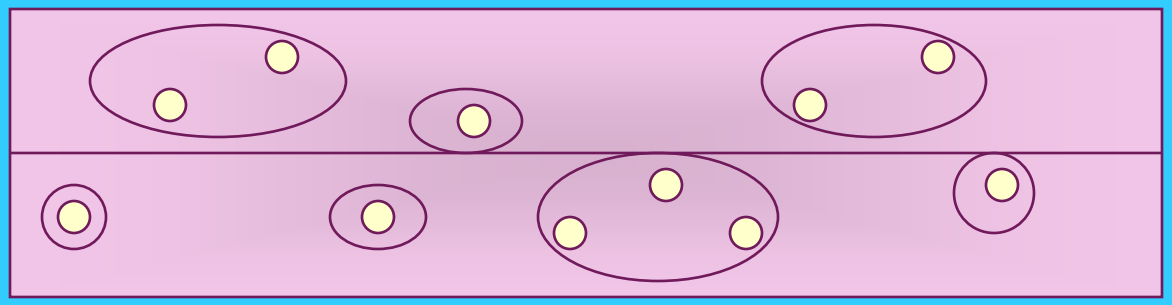
- Use only when the number of occurrences per unit of measure can be counted; non-occurrences cannot be counted.
  - Scratches, chips, dents, or errors per item
  - Cracks or faults per unit of distance
  - Breaks or Tears per unit of area
  - Bacteria or pollutants per unit of volume
  - Calls, complaints, failures per unit of time

Table 10-3

Counting Runs

Figure 10-11

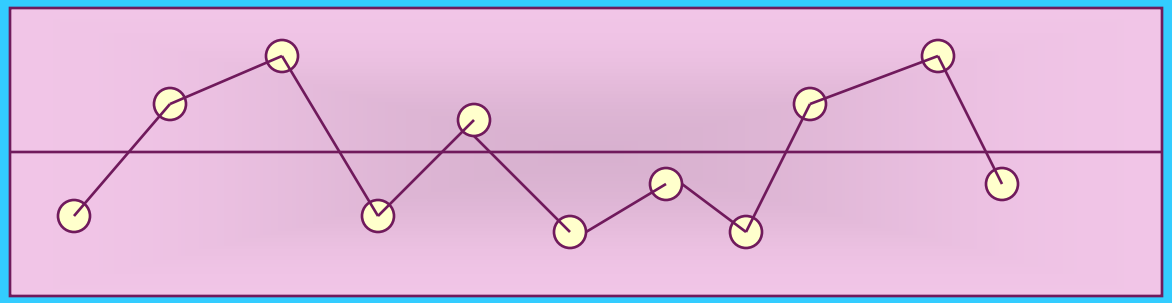
Counting Above/Below Median Runs **(7 runs)**



B A A B A B B B A A B

Figure 10-12

Counting Up/Down Runs **(8 runs)**

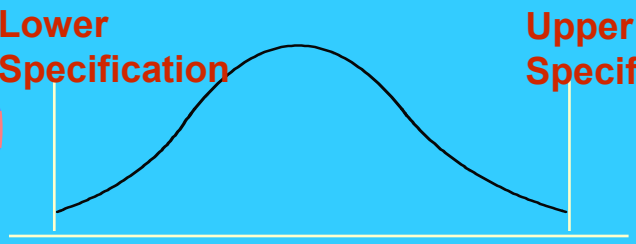


U U D U D U D U U D

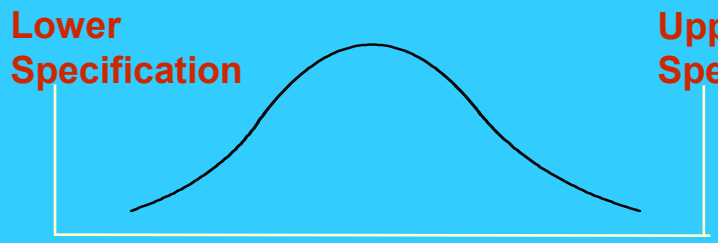
Process Capability

- Tolerances
  - specifications
- Process variability
  - Natural variability in a process
- Process capability
  - Process variability relative to specification

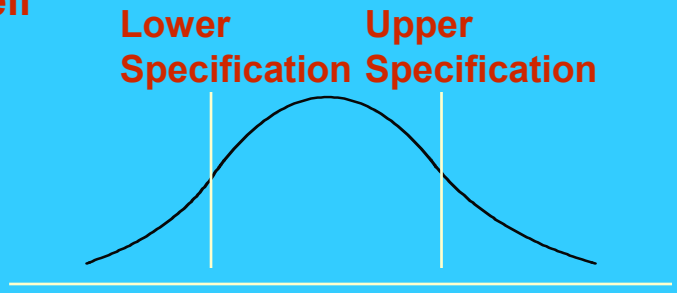
Process Capability



Process variability matches specifications



Process variability well within specifications



Process variability exceeds specifications

Figure 10-14

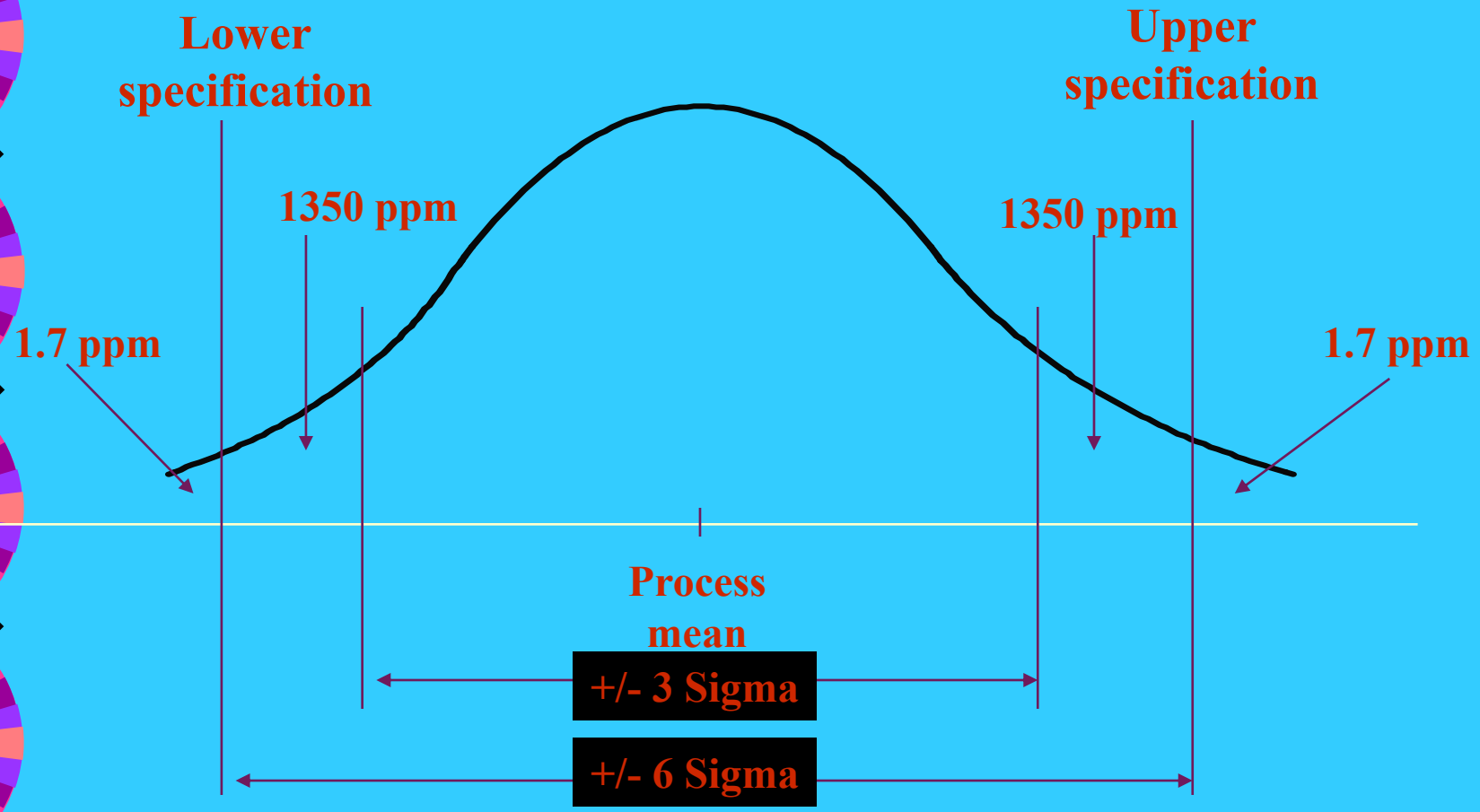
Process Capability Ratio

$$\text{Process capability ratio, } Cp = \frac{\text{specification width}}{\text{process width}}$$

$$Cp = \frac{\text{Upper specification} - \text{lower specification}}{6\sigma}$$

3 Sigma and 6 Sigma Quality

Figure 10-15



Quality Certification

- ISO 9000
- Set of international standards on quality management and Quality assurance, critical to international Business
- ISO 9000 series standards, briefly, require firms to document their quality-control systems at every step (incoming raw materials, product design, in-process monitoring and so forth) so that they'll be able to identify those areas that are causing quality problems and correct them.

The ISO 9000 Series Standards

- ISO 9000 requires companies to document everything they do that affects the quality of goods and services.
  - Hierarchical approach to documentation of the Quality Management System

ISO 9000 Series

Table 9-7

ISO 9000	Helps companies determine which standard of ISO 9001, 9002, and 9003 applies
ISO 9001	Outlines guidelines for companies that engaged in design, development, production, installation, and servicing of products or service
ISO 9002	Similar to 9001, but excludes companies engaged in design and development
ISO 9003	Covers companies engaged in final inspection and testing
ISO 9004	The guidelines for applying the elements of the Quality Management System

Purpose of the Standard

- To Meet Customer Requirements
- Define Quality Policy and Specify Management Responsibility.
- Document System For Improvement
- Develop Corrective and Preventive Measures
- Minimize Personal Judgement.
- Have A System For Upgrading Procedures

Standard Requirements (ISO 9001)

- 4.1 Management Responsibility
- 4.2 Quality System
- 4.3 Contract Review
- 4.4 Design Control

Standard Requirements (ISO 9001)

- 4.5 Document & Data Control
- 4.6 Purchasing
- 4.7 Control of Customer Supplied Material
- 4.8 Product/Service Identification & Traceability

Standard Requirements (Cont.)

- 4.9 Process control
- 4.10 Inspection And Testing
- 4.11 Control of Inspection, Measuring and Test equipment
- 4.12 Inspection And Test Status
- 4.13 Control of Nonconforming Service/ Product
- 4.14 Corrective and Preventive Action
- 4.15 Handling, Storage, Packaging, Preservation and Delivery.

Standard Requirements (Cont.)

- 4.16 Control Of quality Record
- 4.17 Internal Quality Audits
- 4.18 Training
- 4.19 Servicing
- 4.20 Statistical Techniques

ISO Focuses On

- Management Leadership and involvement (4.1, 4.2, 4.18)
- Process and System Improvement (4.13. 4.14, 4.17)
- Process management and Control (4.3, 4.4,4.6,4.9,4.10, 4.12, 4.15, 4.19, 4.20)
- Quality System Support (4.5, 4.7, 4.8, 4.11, 4.16)

Certification Process

- Evaluation stage
- Upgrading quality Management System (QMS)
  - Documentation
  - Development
- Training
- Internal Audit
- Client Audit
- Certification (External Audit)

ISO 10000 Series

ISO 10011	Quality system auditing guide
ISO 10013	Quality manual development guide

ISO 9000 Registration Process

- When an organization feels that its quality system is good enough, it may ask an accredited registrar or other third party audit team for pre-assessment.

ISO 9000 Registration Process

- The final audit begins with a review of the company's quality manual, which the accredited registrar or third party audit team typically uses as its guide. The audit team checks to see that the documented quality system meets the requirement of ISO 9000 and that the organization is practicing what is documented.

- When the registrar is satisfied with the favorable recommendation of the audit team, it grants registration and issues a registration document to the company

ISO 14000

- ISO 14000 - A set of international standards for assessing a company's environmental performance
- Standards in three major areas
  - Management systems
  - Operations
  - Environmental systems

ISO 14000

- Management systems
  - Systems development and integration of environmental responsibilities into business planning
- Operations
  - Consumption of natural resources and energy
- Environmental systems
  - Measuring, assessing and managing emissions, effluents, and other waste

TQM

- Total Quality Management and its Tools

TQM

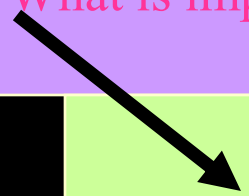
- A philosophy that involves everyone in an organization in a continual effort to improve quality and achieve customer satisfaction.
- TQM is an approach of doing business that attempts to maximize the competitiveness of an organization through the continual improvement of its products, services, people, processes and environment.

Flow of Activities That are necessary to achieve TQM

Organizational Practice

- Leadership
- Mission Statement
- Management commitment
- Effective operating procedures
- Staff support
- Training

Yields: What is important and what to be accomplished



Quality Principles

- Customer focus
- Continuous improvement
- Employee empowerment
- SPC tools
- Benchmarking

Yields: How to do what is important

Flow of Activities That are necessary to achieve TQM

Culture

Management Commitment
Empowerment

Yields: Attitudes to accomplish what is important

Customer satisfaction

Customer focus
Winning orders
Repeat customers

Yields: An effective organization with a competitive advantage

Essential Elements of TQM

- Customer Focus
- Leadership and teamwork
- Quality Culture
- Employee involvement and empowerment
- Education and training
- Decision making and problem solving using TQ tools and others.
- Communication/conflict management
- Implementation issues

Customer Focus

- Richard C. Whitely in his book “ The Customer Driven Company” outlines the characteristic of of organizations that established a customer focus. These are:
- Vision, commitment and climate.
  - Identify customers and their needs.
  - Customer needs are more important than internal needs
  - Deeds and words must show commitment
- Aliment with customer.
  - Customers are consulted
  - Customer feedback is incorporated in products
  - Never promise more than can be delivered.

Customer Focus

- Willingness to find and eliminate customer problems.
  - Monitor customer complaints
  - Analyze customer complaints
  - Eliminate processes and procedures that contribute no value to customer.

Customer Focus

- Use of customer information
- Reaching out to customers
- Competence, capability and empowerment of people.
- Continuous improvement of product and services

Leadership and teamwork

- Leadership is the ability to inspire people to make a total willing, and voluntary commitment to accomplish organization goals.
- Leadership for quality is to inspire people to be effective partnership to achieve quality goals

Leadership for Quality

- In the book Team handbook by Peter Scholtes summarizes the principles for leaders in quality as:
  - Customer focus
  - Obsession with quality
  - Recognizing the structure of work
  - Freedom through control
  - Unity of purpose
  - Looking for facts in the system
  - Teamwork
  - Continuing education and training

Quality Culture

- Quality culture is an organizational value system that results in an environment that is conducive to the establishment and continual improvement of quality. It consists of values, traditions, procedures and expectations that promote quality.

Quality Culture

- The following are characteristic of quality culture:
  - Open, continual communication.
  - Mutually supportive internal partnership.
  - Teamwork approach to problems and processes.
  - Obsession with continual improvement.
  - Broad-based employee involvement and empowerment.
  - Since desire for customer input and feedback

Employee involvement and empowerment

- Employee involvement is to engage them in all levels in thinking processes in the organization.
- Empowerment is employee involvement that matters. It is the difference between having input and having input that is heard, seriously considered and followed up on whether it is accepted or not.

Education and training

- Training is an organized series of activities designed to enhance an individual work-related knowledge, skills, and understanding and/or motivation.
- TQM and SPC require a well planned training program.

Decision making and problem solving using TQ tools and others.

- Approach problems scientifically
- Use TQM tools
- Rely on data
- Validate decisions
- Perform sensitivity analysis

Communication/conflict management

- Communication is the transfer of a message (information, idea, emotion, intent, feeling) that is both received and understood.
- Communication is the oil that keeps TQM running
- Role of communication in TQM
  - It helps in leadership
  - Customer focus
  - Teamwork
  - Empowerment

Implementation Issues in SPC

- Establish culture
- Identify candidate processes
- Prepare tools and equipment
- Implement
- Integrate into QIS.
- Maintain
- Every step requires training

TQM Implementation

- Preparation stage
  - Formation of the TQ steering committee
  - Steering committee team building
  - Steering committee TQ training.
  - Creation of the vision statements and guiding principles.
  - Establishment of broad objectives
  - Communication and publicity
  - Identification of strengths and weaknesses.
  - Identification of advocates and resistors
  - Base line employee attitude
  - Base line customer satisfaction

TQM Implementation

- Planning phase:
  - Plan implementation approach (PDCA)
  - Identification of projects
  - Team composition
  - Team training
  -

TQM Implementation

- Execution stage
  - Team activation (PDCA cycle)
  - Feedback to steering committee
  - Customer feedback
  - Employee feedback
  - Modify infrastructure

Failures of TQM Implementation

- Lack of management commitment
- Lack of leadership
- Resistant to change
- Rushing into the imlementation
- Taking narrow and dogmatic approach
- Inadequate deployment of process
- Lack of adequate training
- Concentration on short term benefits or quick fixes.

Key Contributors to Quality Management

Table 9-6

Contributor	Known for
Deming	14 points; special & common causes of variation
Juran	Quality is fitness for use; quality trilogy
Crosby	Quality is free; zero defects
Ishikawa	Cause-and effect diagrams; quality circles

Quality Awards

Malcolm Baldrige National Quality Award

Table 9-7

- 1.0 Leadership
- 2.0 Strategic Planning
- 3.0 Customer and Market Focus
- 4.0 Information and Analysis
- 5.0 Human Resource Development and Management
- 6.0 Process Management
- 7.0 Business Results

The Deming Prize

- Honoring W. Edwards Deming
- Japan's highly coveted award
- Main focus on statistical quality control

References

- David Goetsch and Stanley Davis, *Introduction to Total Quality Management*, Prentice Hall International,1994.

- http://sol.brunel.ac.uk/~jarvis/bola/operations/index.html