

# QUALITY MANAGEMENT

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# DEFINITIONS

- ***Quality***: Conformance to requirements and fitness of use.
- ***Quality Management***: The process required to ensure that the project will satisfy the needs for which it was undertaken.

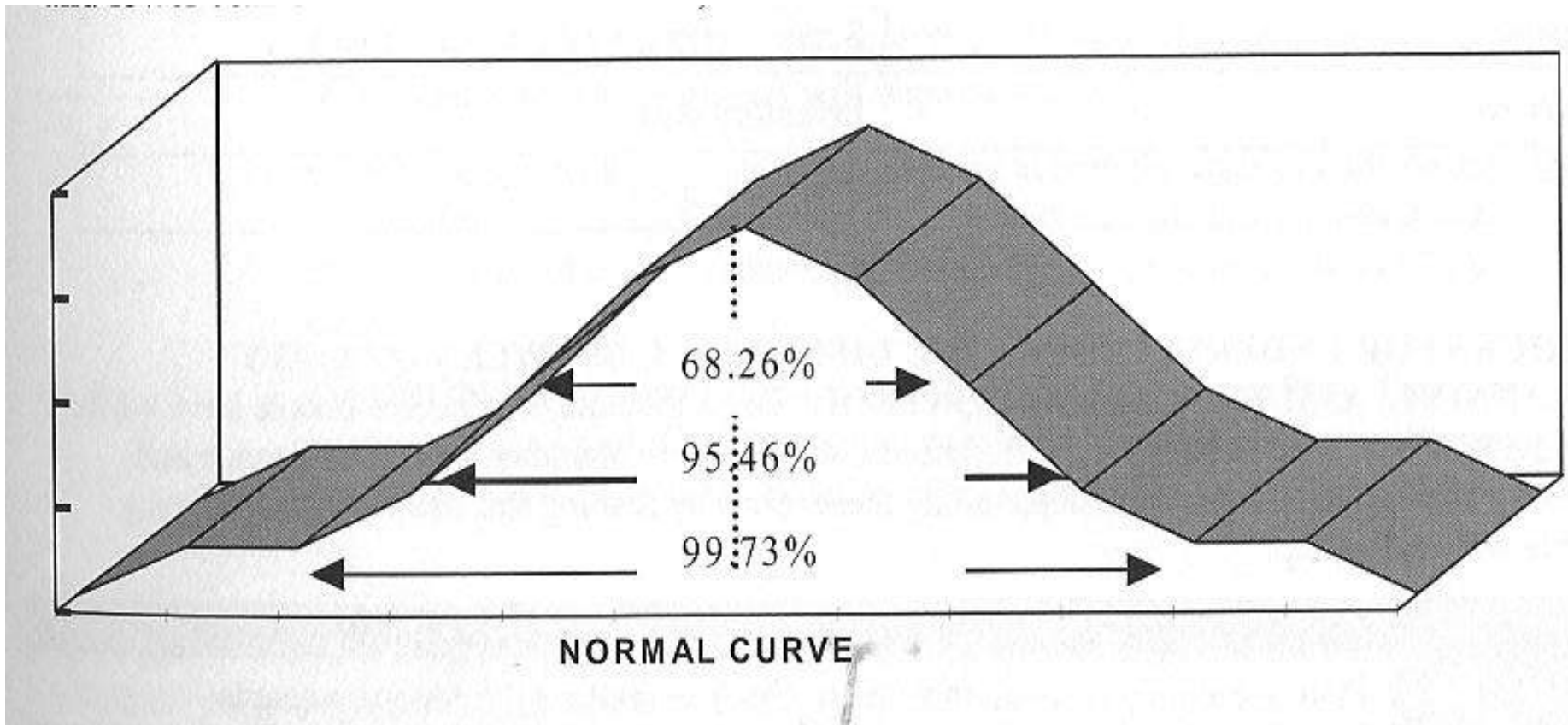
# QUALITY MANAGEMENT CONCEPTS

- ***Total Quality Management (TQM)***: A philosophy that encourages companies and their employees to focus on finding ways to continuously improve the quality of their business practices and products
- ***Continuous Improvement***: Small improvements in products or processes to reduce costs and ensure consistency of performance of products and services.
- ***Prevention over Inspection***: Many years ago, the main focus of quality was on inspection. The cost of doing so is so high that it is better to spend money on preventing problems. “Quality must be planned in not inspected in.”
- ***Measurements and Quantitative Tools***

# QUANTITATIVE QUALITY MANAGEMENT TOOLS

- *3 or 6 Sigma*: Sigma is another name for standard deviation. 3 or 6 sigma represents the level of quality that a company has decided to try to achieve.
  - At 6 sigma, only 1 out of 10,000 doors produced have a problem.
  - At 3 sigma, 27 out of 10,000 will have a problem.
  - Therefore 6 sigma represents a higher quality standard than 3 sigma.

# 3 or 6 Sigma



- ***Pareto diagram:*** A diagram that shows the types of problems and the frequency of their occurrence in order to figure out which problem occurs more frequently and should be prevented. (80/20 rule)
- ***Fishbone diagram:*** The diagram illustrates how various causes and sub-causes relate to create potential problems. (Cause-and-effect)
- ***Control chart:*** Graphic displays of the results, over time, of a process used to determine if the process is in control.
- ***Benchmarking:*** involves comparing actual or planned project practices to those of other projects to generate ideas for improvement and to provide a standard by which to measure performance.

- ***Benefit / Cost Analysis:*** involves estimating tangible and intangible costs and benefits of various projects and product alternatives, and then using financial measures to assess the relative desirability of the identified alternatives.
- ***Flowcharting:*** A flow chart is any diagram that shows how various elements of a system relate. (Cause and effect diagrams, system or process flow charts)
- ***Design of experiments:*** is a statistical method that helps identify which factors might influence specific variables.

- ***Inspection:*** includes activities such as measuring, examining, and testing undertaken to determine whether results conform to requirements.
- ***Statistical Sampling:*** involves choosing part of a population of interest for inspection.
- ***Trend Analysis:*** involves using mathematical techniques to forecast future outcomes based on results. It is often used to monitor technical and cost/schedule performance.



# QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

- ***Quality Assurance:*** Planned and systematic actions to help assure that project components are being designed and constructed in accordance with applicable standards and contract documents.
- ***Quality Control:*** The review of project services, construction work, management, and documentation for compliance with contractual and regulatory obligations and accepted industry practices.

# QA/QC PROCESS

- The owner is primarily responsible for specifying and funding QA/QC activities. The owner works closely with the designer to develop a QA/QC process that focuses on project objectives.
- The designer is responsible for formulating, implementing and administering the design QA/QC plan.
- The contractor develops and implements the construction QA/QC plan for owner's review and approval.
- QA/QC processes involve mutual understanding among participants of their respective concerns and accomplishments, as well as a commitment to resolve problems equitably and quickly.

# TYPICAL CONTRACTOR QA/QC PROGRAM ITEMS

- Recruiting and assigning a skilled work force.
- Quality control organization
- Project progress schedule
- Submittal schedule
- Inspections
- Quality control testing plan
- Documentation of quality control activities
- Procedures for corrective action when quality control and/or acceptance are not met.

# COMPUTERS AND PROJECT QUALITY

- Computer technology offers a wide range of benefits to the project team.
- Computers can improve staff productivity by automating individual tasks, as well as improving integration and coordination for the entire team.
- Computers can help the team improve the speed and accuracy of communication, especially when members are spread over several offices or large geographic areas.

# COMPUTERS AND PROJECT QUALITY (cont.)

- Types of software packages used by project team members:
  - Word Processors
  - Spreadsheets
  - E-mail
  - Databases
  - Project Management and Collaboration
  - Computer-Aided Drafting (CAD)
  - Accounting
  - Presentation
  - Desktop Publishing

# COMPUTER TOOLS FOR THE OWNER

- *Facility operation* (planning, scheduling, and administering maintenance and repair operations, managing inventories)
- *Financial management* (tracking and managing project assets)
- *Facility space management*
- *Communications management*
- *Human resources*

# COMPUTER TOOLS FOR THE DESIGNER

- CAD software
- Specifications-writing software
- Design software
- Electronic information exchange
- Coordination and communication

# COMPUTER TOOLS FOR THE CONTRACTOR

- Quantity calculations
- Project management
- Document control
- Submittal tracking
- Information management