Unit 1:
L-3
Statistical Quality Control

Lecture Objectives:

The objectives of this lecture are, first, to define quality as it relates to the manufacturing and service sector, to introduce the terminology related to quality, and to set up a frame work for the design and implementation of quality.

Lecture Objectives:

- Introduction to Phil Crosby
- Definition of Quality
- Quality Improvement Program
- Managing Quality in the 21st Century

Absolutes of Quality Management

Absolutes of Quality Management

- Absolutes answer four questions
  - What is quality?
  - What system is needed to cause quality?
  - What performance standard should be used?
  - What measurement system is required?

First Absolute

- The definition of quality is conformance to requirements
  - Quality means conformance, not elegance or goodness
  - "Do It Right the First Time (DIRFT)"
  - Management has 3 tasks related to this:
    - Clearly establish requirements
    - Supply means to meet requirements
    - Spend time helping employees meet requirements
  - In software—invest in quality requirements

Quality Requirements

- Software requirements must conform to the requirements for software requirements:
  - Correct
  - Complete
  - Unambiguous
  - Consistent
  - Traceable
  - Modifiable
  - Verifiable
  - Prioritized

The Second Absolute

- The system of quality is prevention
  - The system for causing quality is prevention, not appraisal.
  - An error that does not exist can't be missed.
  - Secret of prevention is to look at process and identify opportunities for error
  - Prevention in software engineering is the result of a good process including early inspections, reviews, testing

The Third Absolute

- The performance standard is zero defects
  - Not a “motivational” program. It is a management standard tells people what is expected of them.
  - Employees perform to the standards of the leaders.
  - Mistakes caused by two factors:
    - **Lack of knowledge**. Knowledge can be measured in deficiencies corrected through tried-and-true means.
    - **Lack of attention**. Must be corrected by the person himself or herself. An attitude problem.

The Fourth Absolute

- **The measurement of quality is the price of nonconformance**
  - Traditional quality measurements are technical in nature, however, they need to be converted to numbers that management understands.
  - **Price of Conformance**. All expenses necessary to make things right. Quality functions, prevention efforts, quality education.
  - **Price of Nonconformance**. All expenses involved in doing things wrong. Cost of fixing problems, correcting orders, correcting products, warranties.

Four Pillars for Making quality certain

1. Management participation and attitude
   - Overcome traditional definition of quality
2. Professional quality management
   - Must be at same level as other departments
3. Original programs
   - Numerous programs at unit level
   - Takes 4-5 years for concepts to take hold
4. Recognition
   - Shining star of the entire integrity system

References

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- P. Crosby, *Quality Without Tears*, McGraw-Hill, 1984.
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