Quality Engineering and Management

Lecture I
Background and History of Quality

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History of Quality Management
[Quality was critical, but relatively easy to identify]

History of Quality Management
[Penalties for Poor Quality Increased]

History of Quality Management
[Mass Production Increased the Complexity]

History of Quality Management
[Technology Is and Will Continue Changing Things]

Middle Ages

Products were produced by skilled trades trained in an apprentice system

The craftsmen were responsible for their and their apprentice’s quality
History of Quality Management

Industrial Revolution

Specialization of labor

Responsibility for quality moved to the organization

Age of Mass Production

Henry Ford’s system was based on mass consumption

Limited products
  - any color as long as it is black
  - Assembly line - higher wages, lower cost
  - disassembly earlier in slaughterhouses

“Taylorism” (Frederick Taylor)

Scientific study of production
  - now called Kaizen, Lean, etc.

“one best way” defined by engineers and followed by workers
  (not a participative management style)

“New” focus of lean mfg and 6 sigma

WW II

Increased focus required by military buildup

Speed of production

Systematic approach to quality

Initiation of government efforts to ensure quality

Established military standards (MilStd) for QC

MilStd’s were applied to defense contracts
**History of Quality Management**

**Post War Period**

Favorable economy led to -
Consumption and a consumer economy

Significant increase in
Volume of sales
Variety of products

**American Society for Quality Control**

founded 1946

objective: to share research and applications to improve quality

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**Transformation of Japan**

Productivity improvements
Quality improvements

Previously considered “cheap copies” of products developed elsewhere

U.S. consumers expectations changed based on the improved product reliability of Japanese products

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**1980 NBC prime-time documentary titled:**

“If Japan Can, Why Can’t We”

compared productivity and quality in Japan with leading U.S. companies through interviews with US executives

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1980 NBC prime-time documentary titled:

“If Japan Can, Why Can’t We”

introduced W. Edwards Deming to the U.S. public credited with “turning Japan’s production around”
History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- Upper management emphasis on product quality
  Mgmt “action” in addition to “support”

- All levels of the organization receive training in
  quality statistics team problem solving

- Systematic continuous improvement activities
  as opposed to “fire fighting”

- Analysis of every problem
  large or small

- Gather data
  base decisions on valid information

- Deal only in “facts” separate “perceptions” from “reality”
History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- Use of "on-line" quality control
  [i.e., control charts]

- Use of "off-line" quality control
  [designed experiments to optimize product and process design]

Total Quality Management is Born

Traditional view: quality versus cost

New view: high quality is accompanied by lower costs