

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]



History of Quality Management

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

History of Quality Management

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

History of Quality Management

"Taylorism" (Frederick Taylor)

Scientific study of production

- now called Kaizan, Lean, etc.

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

History of Quality Management

"Taylorism" (Frederick Taylor)

Taylor's 3 S's

Standardization

Specialization

Simplification

"New" focus of lean mfg and 6 sigma

History of Quality Management

WW II

Increased focus required by military buildup

Speed of production

Systematic approach to quality

History of Quality Management

WW II

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**

History of Quality Management

Post War Period

American Society for Quality Control

founded 1946

**objective: of sharing research and
applications to improve quality**

History of Quality Management

Transformation of Japan

Productivity improvements

Quality improvements

History of Quality Management

Transformation of Japan

**Previously considered "cheap copies"
of products developed elsewhere**

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

History of Quality Management

Transformation of Japan

**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**

History of Quality Management

Transformation of Japan

**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"

History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- **All levels of the organization receive training in**

**quality
statistics
team problem solving**

History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- **Systematic continuous improvement activities**

as opposed to "fire fighting"

History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- **Analysis of every problem**

large or small

History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- **Gather data**

base decisions on valid information

History of Quality Management

Transformation of Japan

Characteristics of the Japanese approach

- **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]***

History of Quality Management

Total Quality Management is Born

Traditional view: quality versus cost

***New view: high quality is accompanied by
lower costs***