Lecture #2

Prof. John W. Sutherland

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Quality Engineering (MEEM 4650 / 5650)
Dept. of Mechanical Engineering - Engineering Mechanics
Michigan Technological University

Our View of Quality

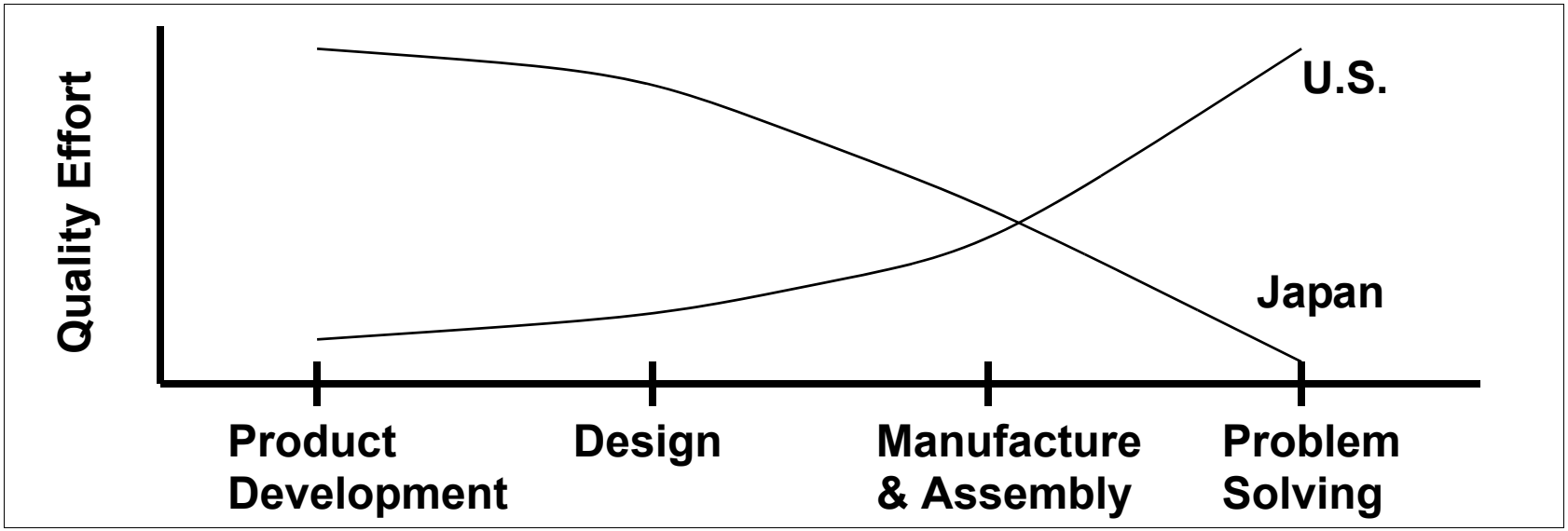
- **Today's attitude much different (hopefully) than two decades ago.**
- **The statistical theory has remained the same....**
- **Philosophy underlying quality has changed.**

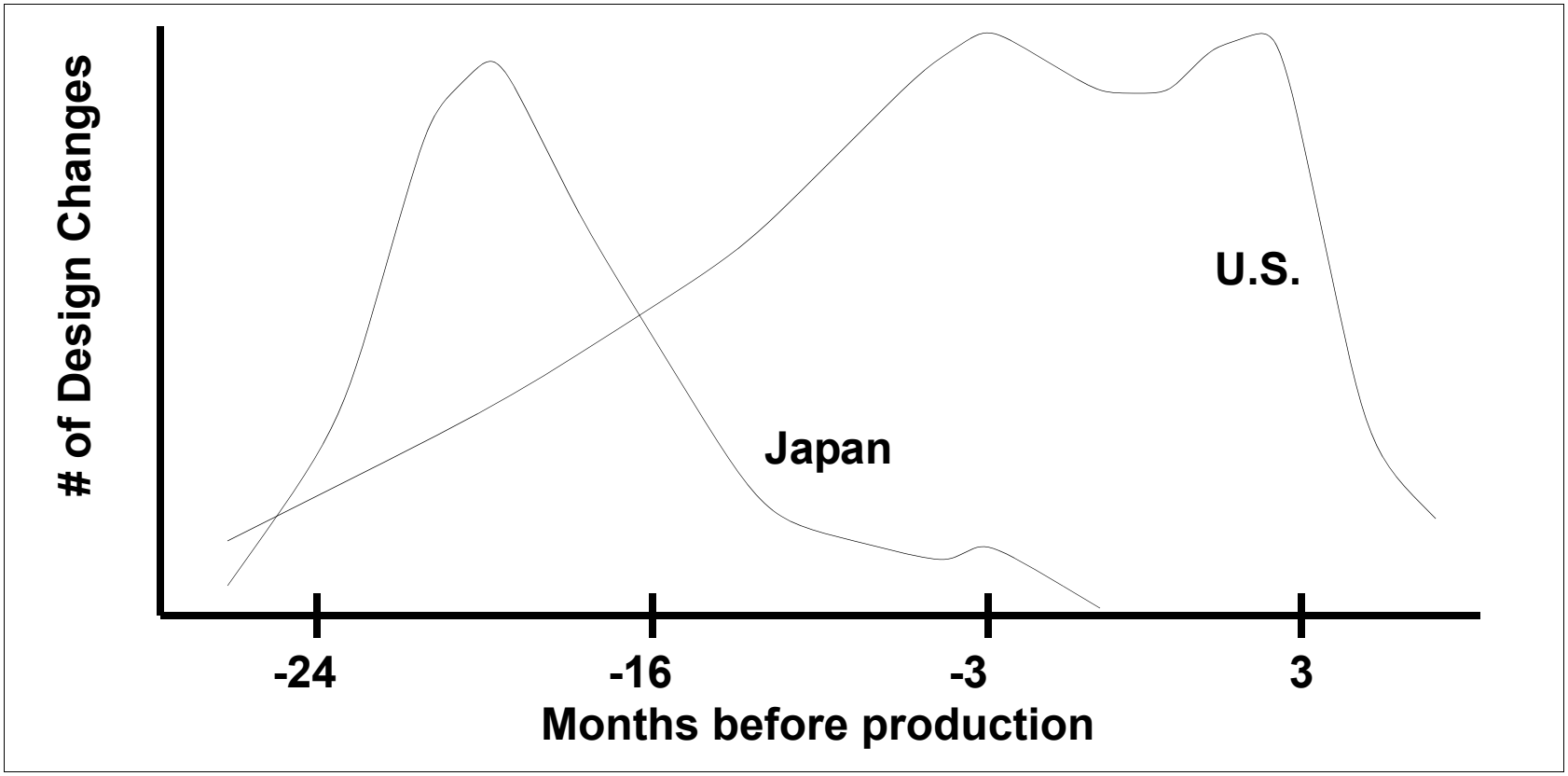
  Quality movement.

  We must understand why we wish to pursue quality improvement.

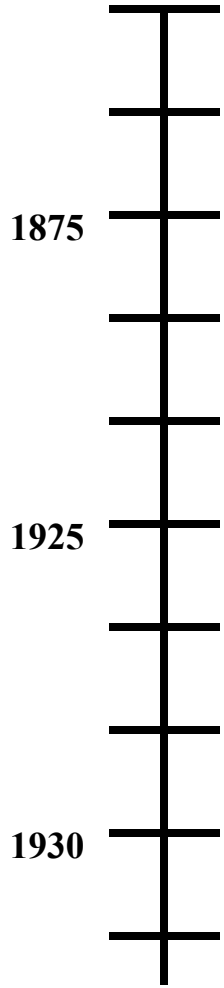
Status - early 1980s

- Competitive position U.S. companies eroded - Japan dominates marketplace - some industries lost
- How did we end up in this situation??





- **Let's take a look (focus on quality) at what has happened in the past**



Pre-industrial Revolution

Quality "controlled" by the individual craftsman.

1875

Birth of "Taylorism"

Mass production and division of labor concepts.
F. W. Taylor develops the principles of scientific management.
"Workers are lazy."
Wage incentive plans and time standard - only production counts.

1925

Shewhart Introduces Statistical Process Control

Walter Shewhart develops a statistical approach to improve processes - emphasis is on fault elimination.
Focus is on economic control of the process
People don't accept his idea.

1930

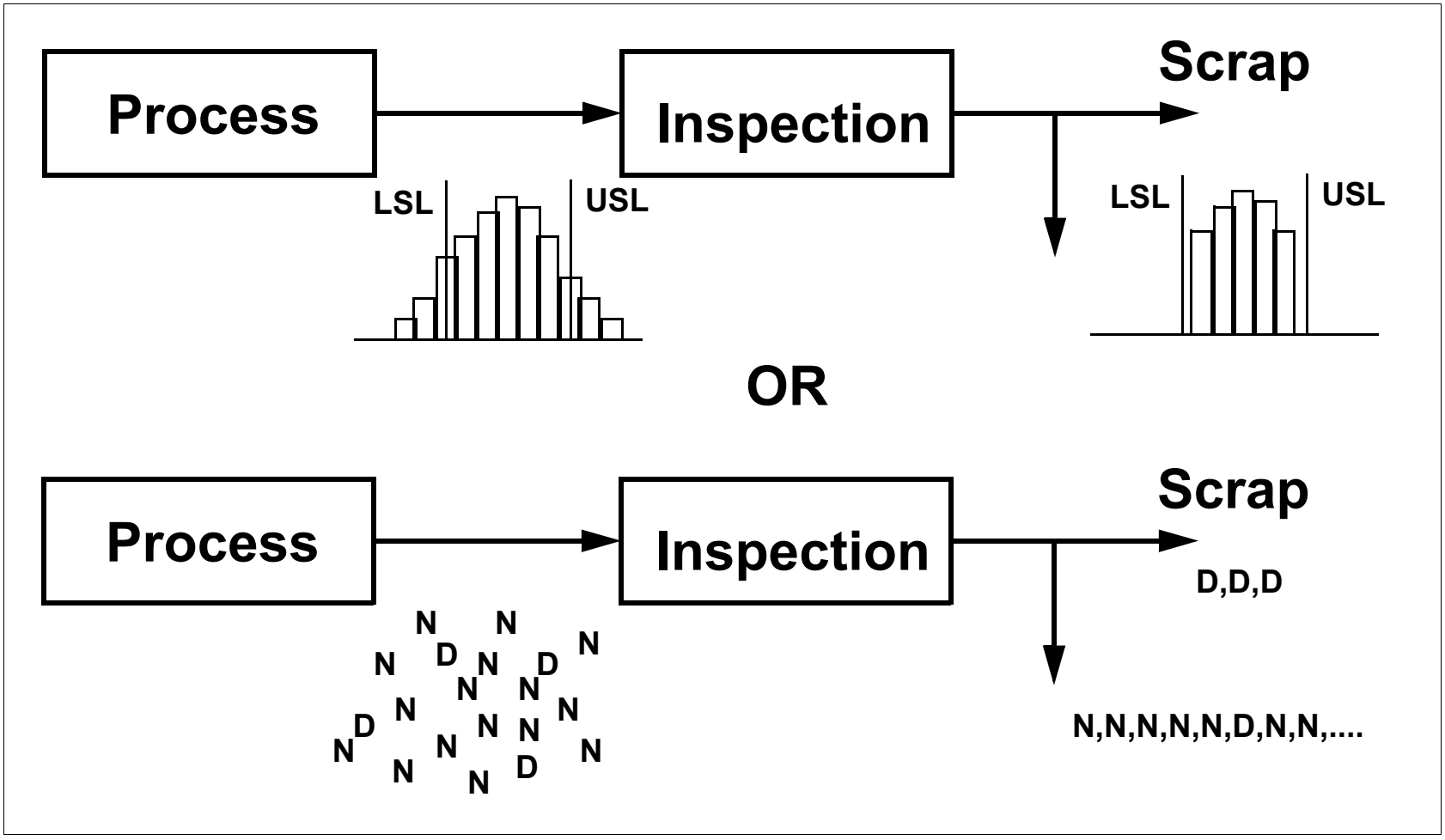
Dodge and Romig

"Acceptance sampling."
Lot-by-lot inspection.
Probabilistic approach.

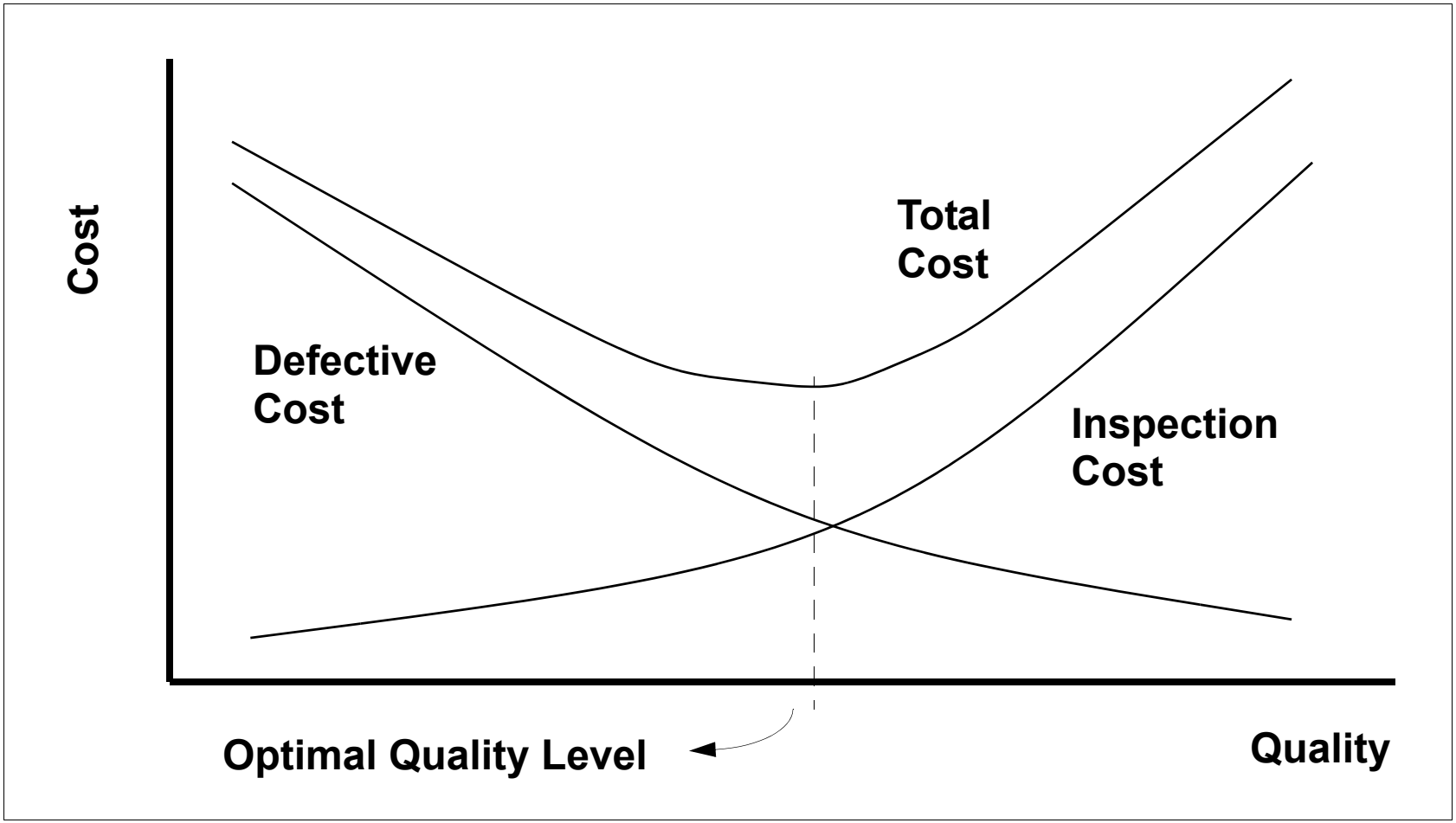
F. W. Taylor

- Prior to his efforts, all manufacturers “equally bad”.
- People that adopt his ideas achieve success -- others fall by the wayside. Playing field is “un-leveled”.
- Phenomenon played out again during the quality revolution.
- Math class (20 students) -- 5 students given calculators. Who will succeed??

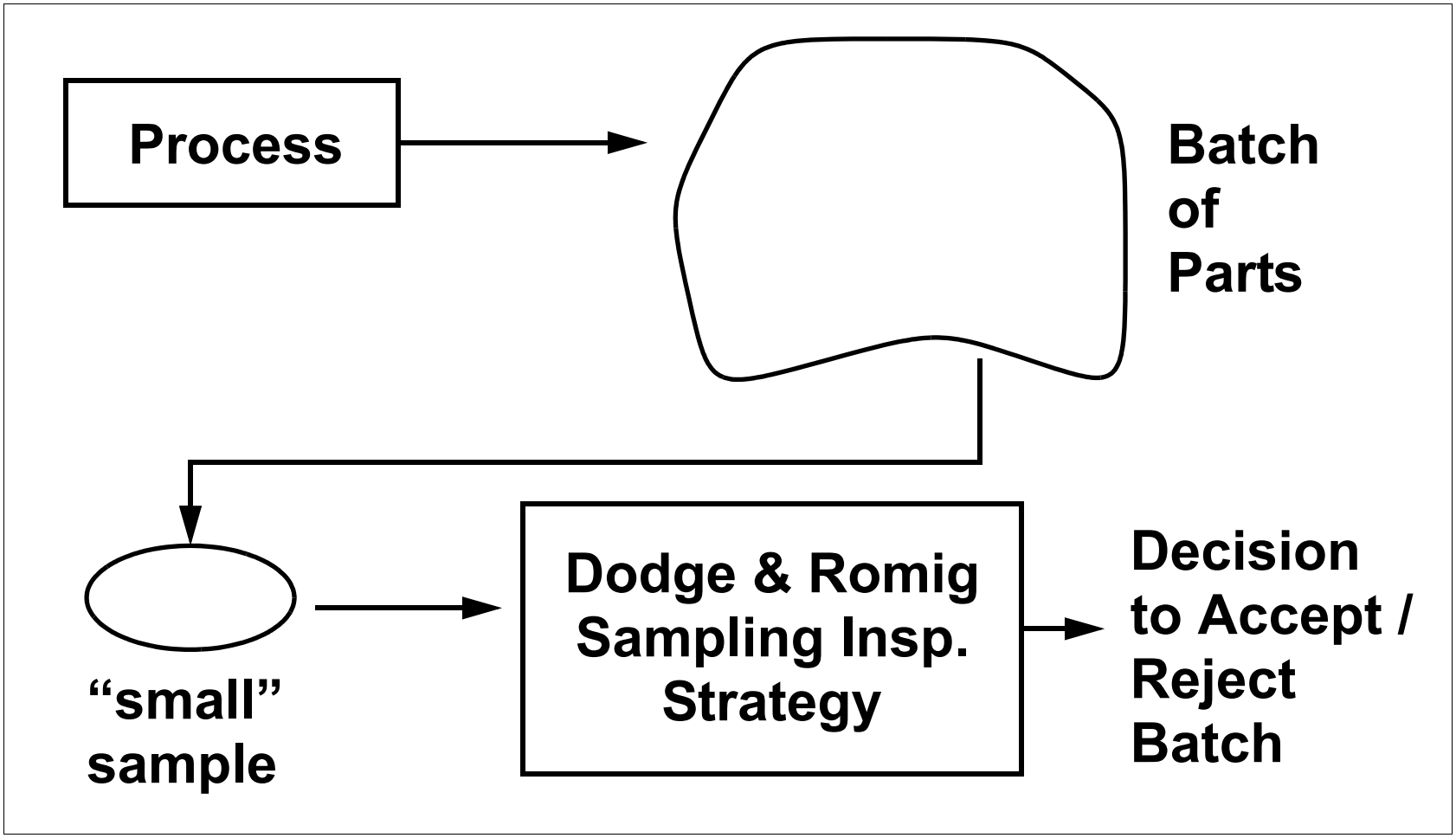
Product Control



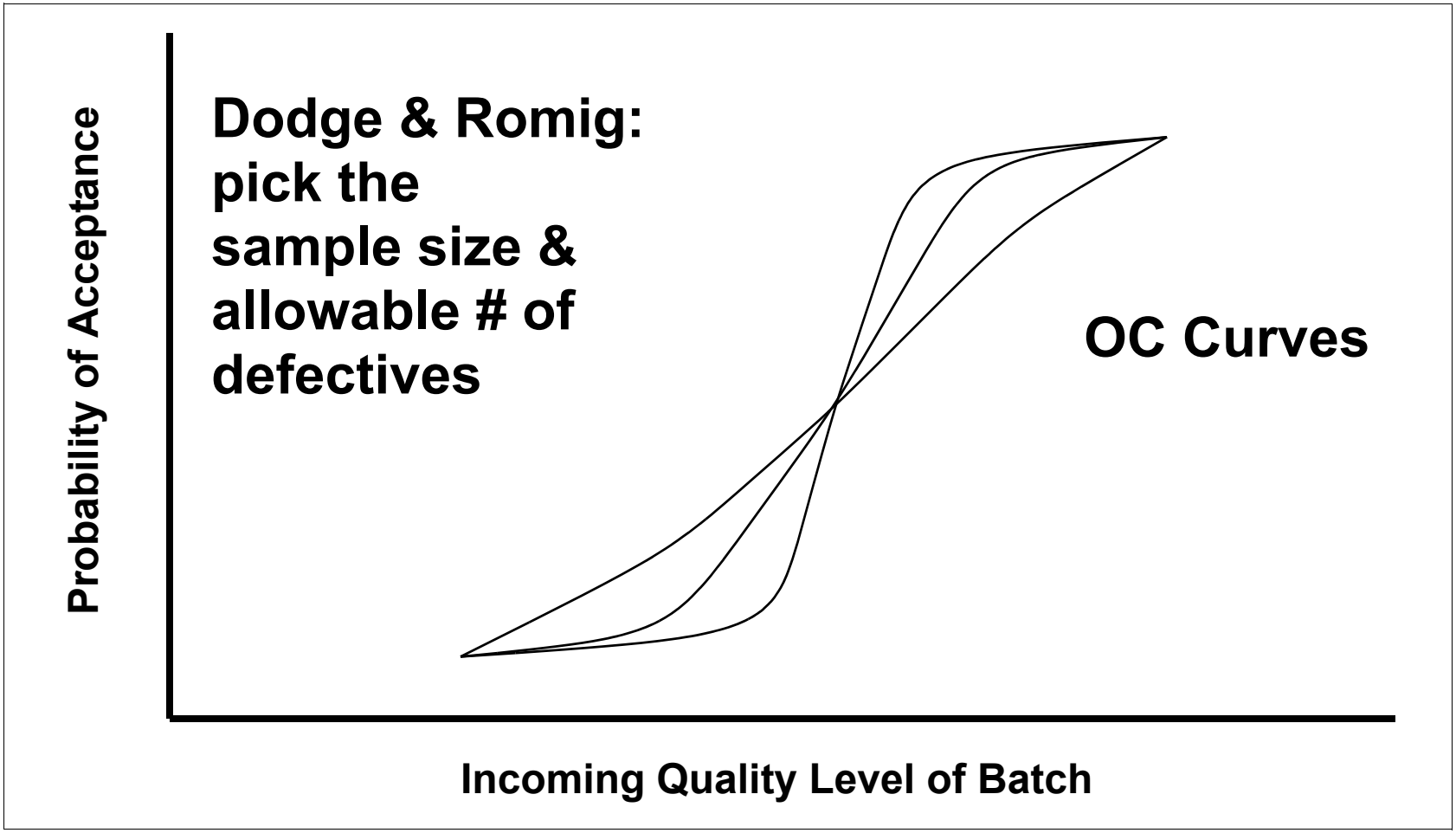
Quality Cost



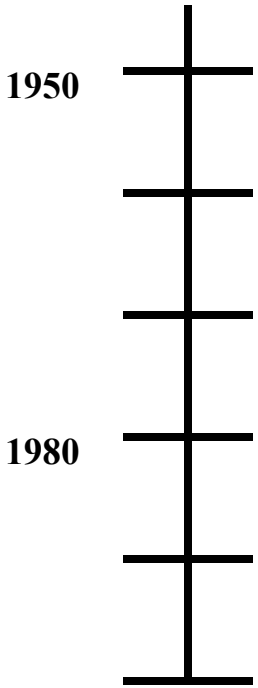
Acceptance Sampling



Dodge - Romig Plan



History (cont.)



Deming Approach to Quality/Productivity Improvement

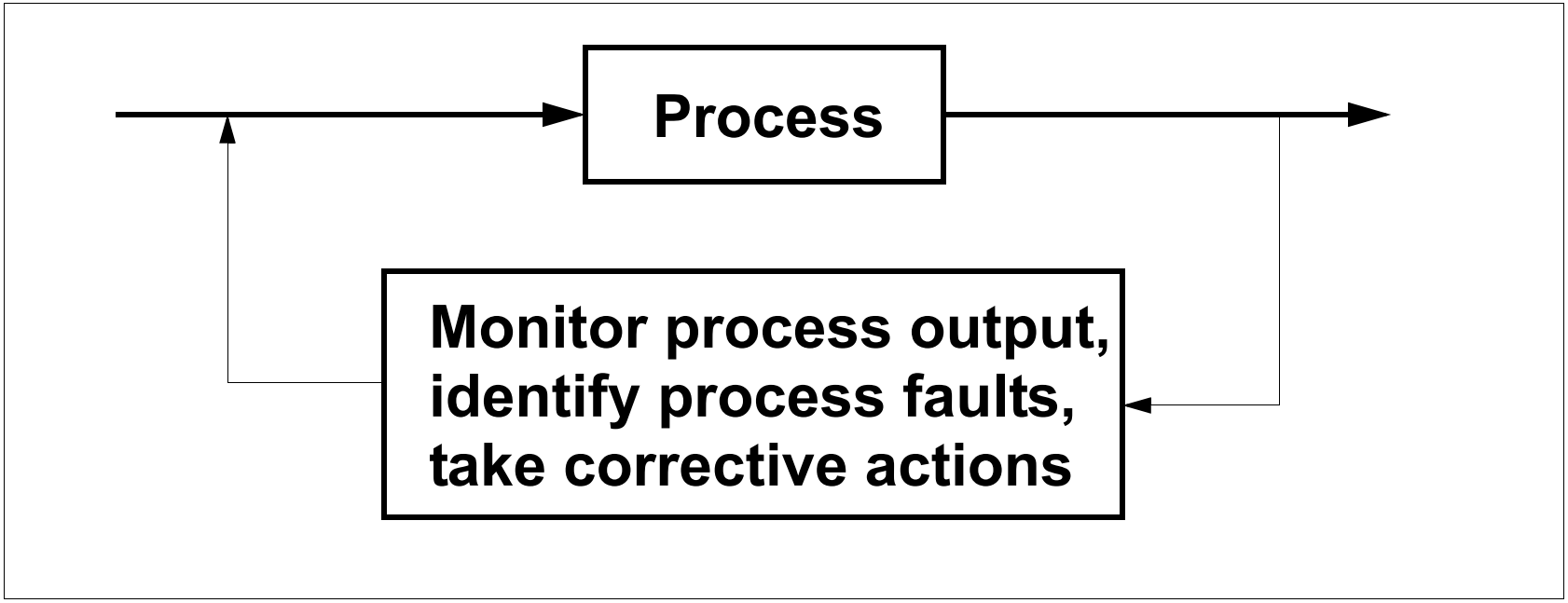
- Statistical process management.
- Follows the work of Shewhart.
- Emphasizes the responsibilities of top management.
- Doesn't get attention in the U.S. but is welcomed in Japan

United States Recognizes Deming Approach and Taguchi Methods

- U.S. industry begins to adopt Deming's philosophy, Taguchi methods, and statistical design of experiments.
- Emphasizes engineering design.

Introduction to Deming

- Fallacy of “Optimal Quality Level” Concept
- Product versus Process Control

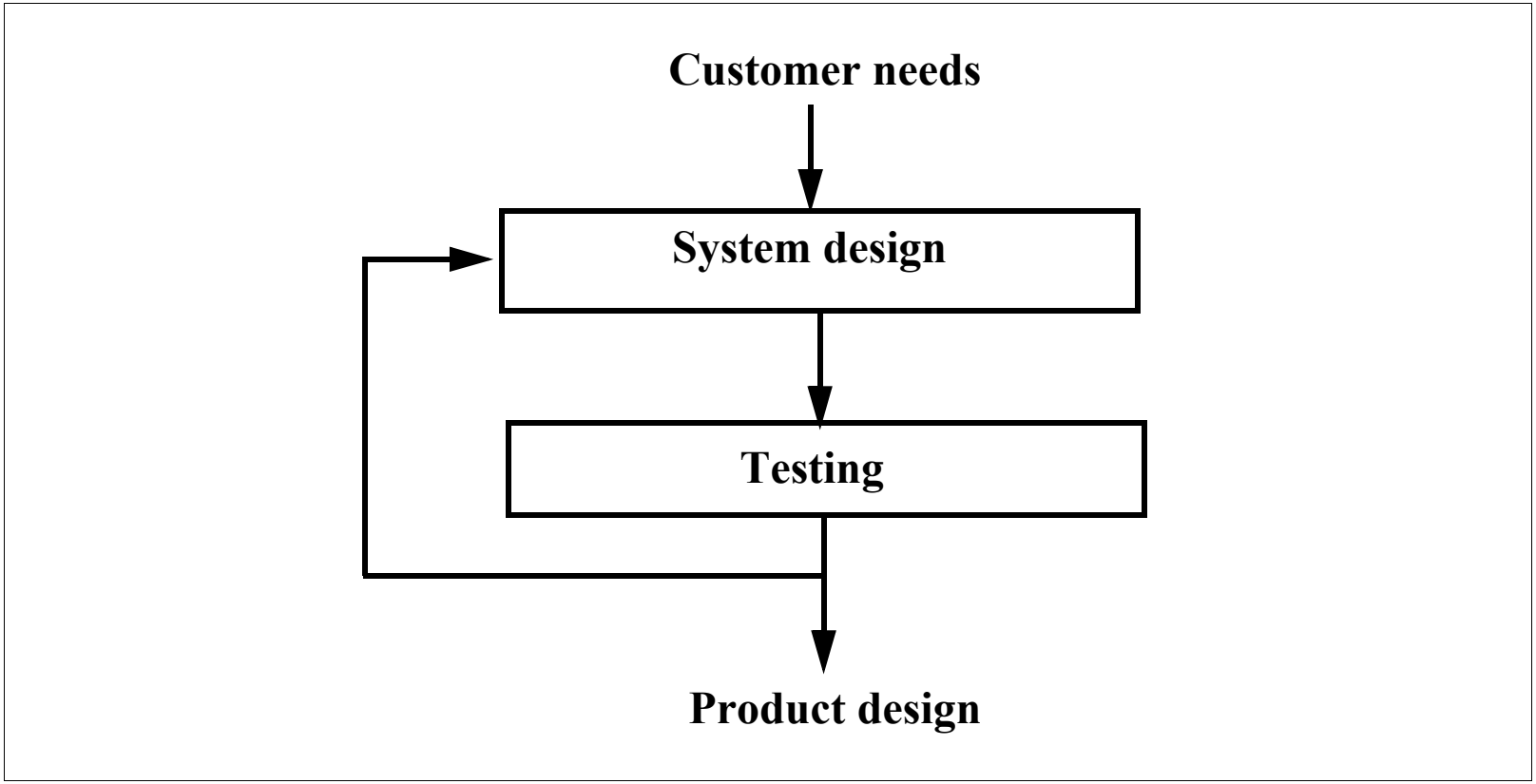


More Deming

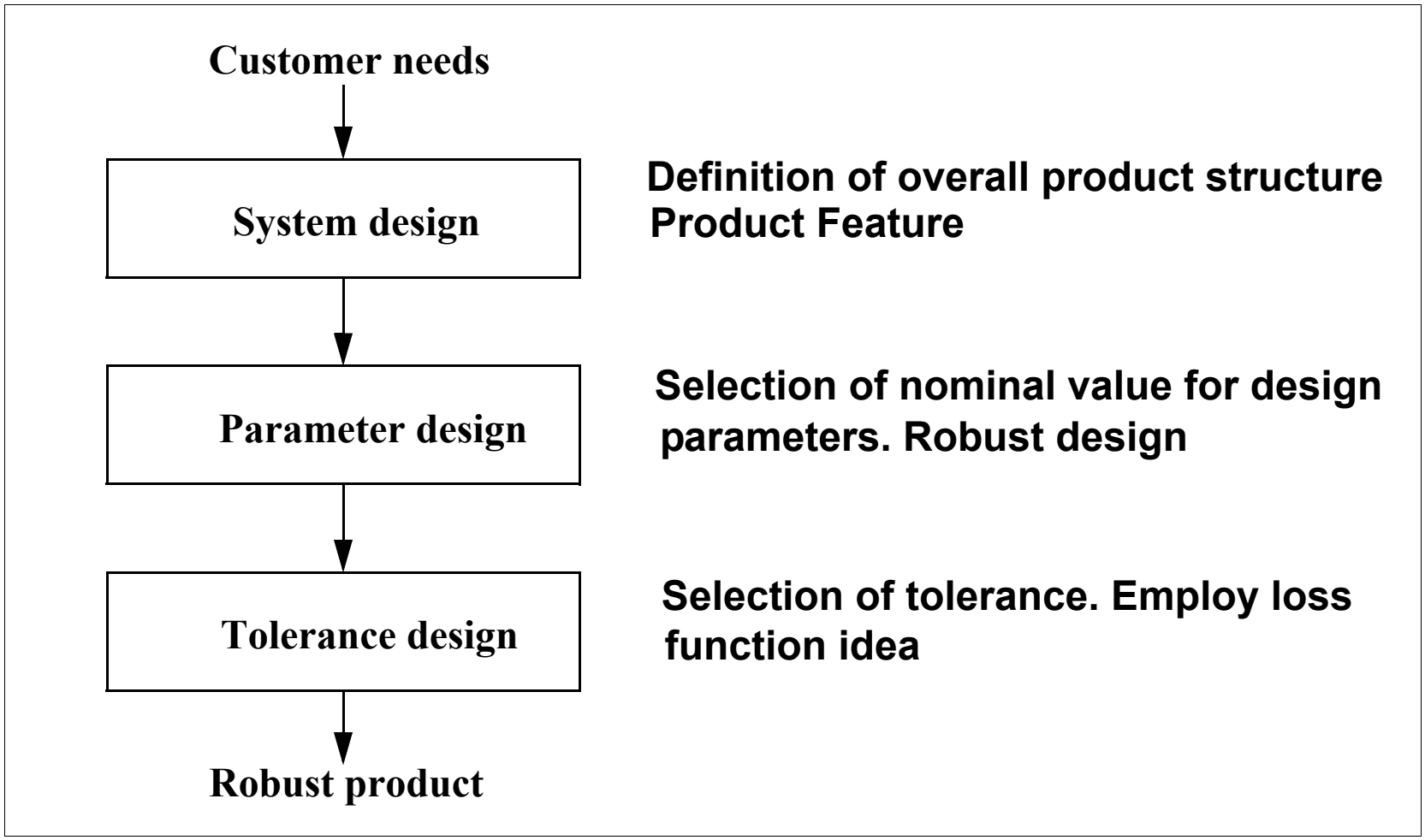
- 14 Points (Obligations of Top Management)
- Manage for the long view
- Workers want to do their job well -- monetary incentives aren't everything
- Everyone participates
- Data based conclusions -- not subjective
- People are assets

Engineering Design

Traditional View



Taguchi's View of Engineering Design



Strengths of Taguchi's Approach

- **Center of Gravity: Engineering Design process**
- **Definition of the roles of factors that influence product/process performance**
- **Robust Design -- Parameter Design Concept**
- **Use of the Loss Function -- link between variation and economic performance**