Software Quality Assurance (SQA)

Lecture 1

Introduction to course

QUALITY?

- **It is not the “goodness” or “elegance” but “conformance to requirements”**

  (Crosby)

- **“fitness for use”**

  (Juran)

- **Ultimately: “Customer Satisfaction”**

- **Software Quality is**
  1. **The degree to which a system, component, or process meets specified requirements, and**
  2. **The degree to which a system, component, or process meets customer or user needs or expectations.**

(IEEE)

- **Quality is:**

The totality of features and characteristics of a product or service that bear on its ability to satisfy specified or implied needs.

(ISO)

Software Quality Assurance (SQA):

- **Software Quality Assurance (SQA) is**
  - **(1) A planned and systematic pattern of all actions necessary to provide adequate confidence that an item or product conforms to established technical requirements.**
  - **(2) A set of activities designed to evaluate the process by which products are developed or manufactured.**

(IEEE 610)

Quality Control (QC):

- Quality control can be defined as "part of quality management focused on fulfilling quality requirements."
- “The operational techniques and activities used to fulfill requirements for quality."
- A system of maintaining standards in manufactured products by testing a sample of the output against the specification.

Quality Cycle

Quality Assurance (QA)

Quality Control (QC)

Resources

Product (80)

Inputs (100)

Outputs (100)

Loss (10)

Recycling Items (10)

More on Quality...

- **Quality is not absolute** - it means different things in different situations
- **Quality is multidimensional** - it has many contributing factors and cannot be easily summarized
- **Quality is subject to constraints** - assessment is constrained by cost (of many types)
- **Quality is about acceptable compromises** - when quality is constrained, compromises are required.
- **Quality criteria are not independent** - they interact with each other and cause conflicts.

Quality in business context:

- Quality is a competitive issue now
- Quality is a must for survival
- Quality gives you the global reach
- Quality is cost effective
- Quality helps retain customers and increase profits
- Quality is the hallmark of world-class business

The Deming Chain

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Cost of Quality:

Cost of Conformance

Prevention Costs

(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project to avoid failures

Cost of Nonconformance

- **Internal Failure Costs**

  (Failures found by the project)

  - Rework
  - Scrap

- **External Failure Costs**

  (Failures found by the customer)

  - Liabilities
  - Warranty work
  - Lost business

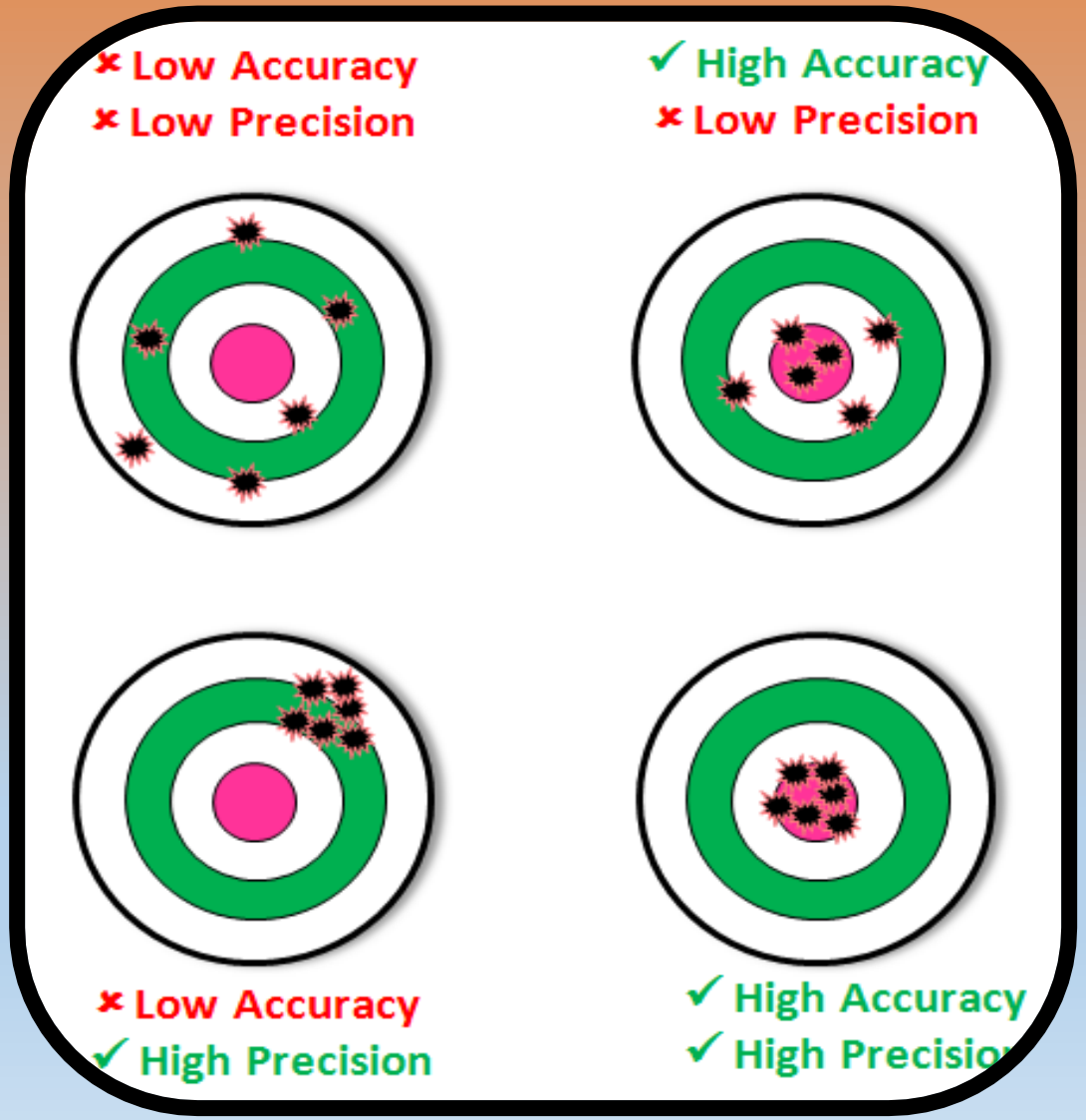
Money spent during and after the project because of failures

Some more concepts:

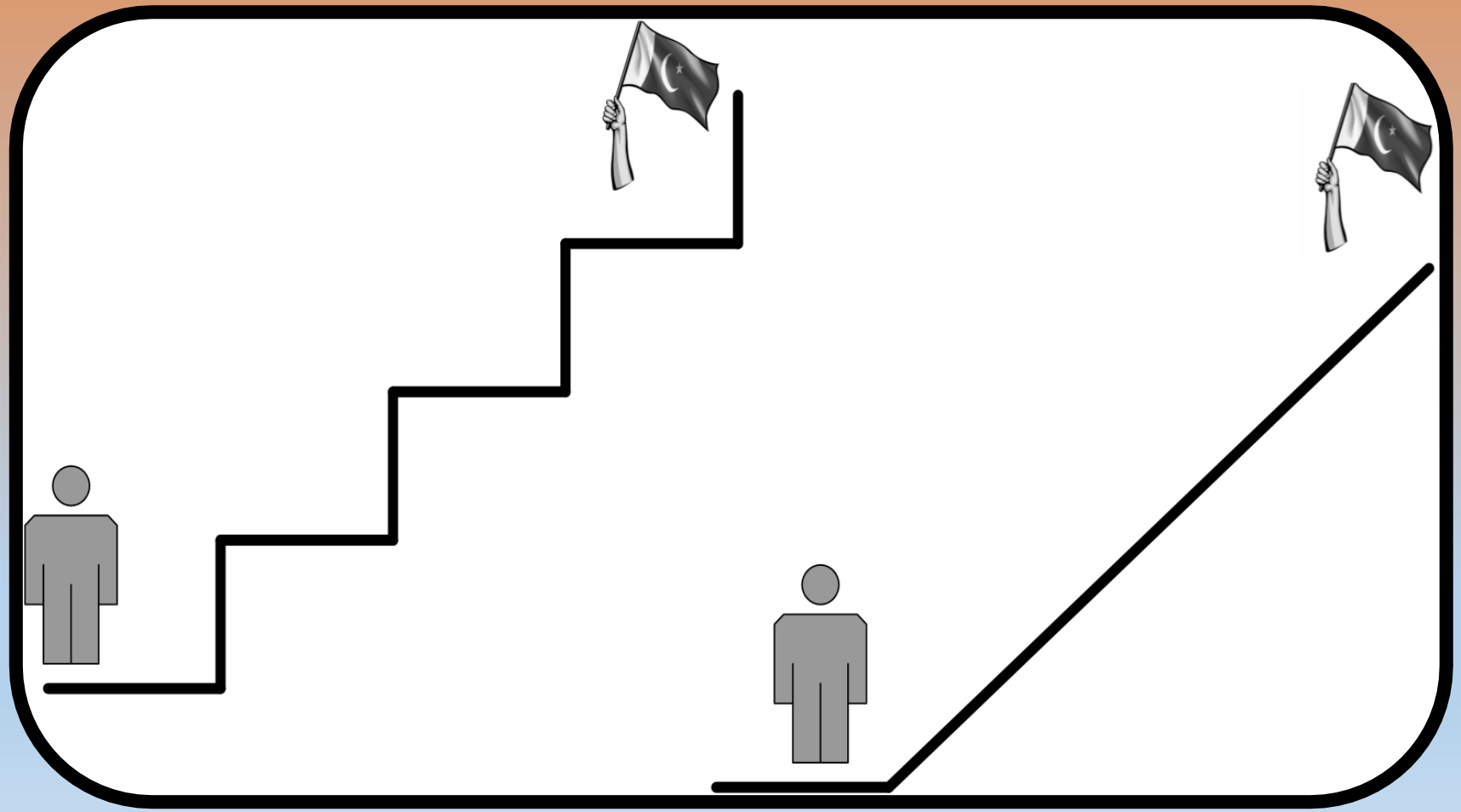
1. Quality and Grade
2. Precision
3. Accuracy
4. Gold Plating
5. Continuous Improvement
6. Customer Satisfaction
7. Prevention over inspection
8. Management Responsibility
9. Quality is planned in,

   not inspected in

Precision Vs Accuracy



CONTINEOUS VS CONTINUAL ‘Improvement’



8 Quality Principles by ISO

1. Customer Focus
2. Leadership
3. Involvement of People
4. Process Approach
5. System Approach to Management
6. Continual Improvement
7. Factual Approach to Decision Making
8. Mutually beneficial supplier relationship

Thank You