CHAPTER 2
QUALITY CONTROL AND MANAGEMENT

BASIC COMPETENCIES

Students are able to understand the concepts of quality control and management, analyze quality data, and communicate the results of quality analysis in English with appropriate terminology.

LEARNING OBJECTIVES

After studying this chapter, students are expected to:

1. Understand and use the terminology of quality control and quality management
2. Read and understand the procedure text in the context of quality inspection
3. Menulis quality analysis report dan improvement proposals
4. Presenting quality issues and solutions effectively
5. Using passive voice in the context of technical writing

PHASE 1: PRE-ACTIVITY

Early Knowledge Activation

Brainstorming Activity:

1. What does "quality" mean in the context of manufacturing?
2. Mention products that you think are of high quality. Why?
3. What is the difference between Quality Control and Quality Assurance?

Pre-Assessment:

Rate your current knowledge (1-5):

- Quality terminology: _____
- Statistical quality control: _____
- Quality management systems: _____
- Quality improvement tools: _____

PHASE 2: INPUT & EXPLORATION

PROCEDURE TEXT: HOW TO CONDUCT A QUALITY INSPECTION

About Procedure Text: A procedure text is a type of text that explains how something is accomplished through a sequence of actions or steps. It typically includes: (1) Goal/Aim, (2) Materials/Equipment needed, and (3) Steps/Procedures (International Organization for Standardization, 2015).

Task 1. Read the following procedure text carefully and answer the questions that follow.

STANDARD OPERATING PROCEDURE FOR PRODUCT QUALITY INSPECTION

Goal:

To ensure all manufactured products meet established quality standards and specifications before delivery to customers.

Materials and Equipment:

- Quality inspection checklist
- Digital calipers and measuring instruments
- Visual inspection magnifying glass

- Testing equipment (as applicable)
- Product specification documents
- Non-conformance report forms
- Personal protective equipment (PPE)

Procedure:

Step 1: Preparation – First, gather all necessary inspection tools and documents. Ensure that all measuring instruments are calibrated and functioning properly. Review the product specifications and quality standards that must be met. Put on appropriate personal protective equipment before handling products.

Step 2: Sample Selection – Next, select a random sample from the production batch according to the Acceptable Quality Limit (AQL) sampling plan. The sample size should be determined based on the batch size and inspection level required. Record the batch number, production date, and quantity inspected.

Step 3: Visual Inspection – Then, conduct a thorough visual examination of each sample unit. Check for surface defects such as scratches, dents, discoloration, or contamination. Verify that labels, markings, and packaging are correct and properly applied.

Step 4: Dimensional Measurement – After that, measure critical dimensions using appropriate measuring instruments. Compare measurements against the specifications defined in the product documentation. Record all measurements on the inspection checklist.

Step 5: Functional Testing – Subsequently, perform functional tests to verify that the product operates as intended. Test all features and functions according to the test protocol. Document any deviations from expected performance.

Step 6: Documentation and Reporting – Following testing, complete the inspection report with all findings. Mark each item as "Pass" or "Fail"

based on the acceptance criteria. If defects are found, complete a non-conformance report detailing the nature and quantity of defects.

Step 7: Final Decision – Finally, make an accept or reject decision for the batch based on the inspection results. If the batch passes inspection, authorize it for shipment. If the batch fails, segregate non-conforming products and initiate corrective action procedures.

Source: Adapted from International Organization for Standardization. (2015). ISO 9001:2015 Quality management systems — Requirements. ISO.

Questions.

A. Text Comprehension

1. What is the main goal of conducting a quality inspection?

Answer: _____

2. List five materials or equipment needed for the inspection process.

Answer: _____

3. According to the text, what should be done during the preparation step?

Answer: _____

4. How is the sample size determined for inspection?

Answer: _____

5. What types of surface defects should inspectors look for during visual inspection?

Answer: _____

B. Critical Thinking

6. Why is it important to calibrate measuring instruments before conducting an inspection?

Answer: _____

7. What would happen if a company skipped the functional testing step?

Answer: _____

8. Explain the importance of documentation in quality inspection.

Answer: _____

9. How does proper quality inspection contribute to customer satisfaction?

Answer: _____

10. What corrective actions might be taken if a batch fails inspection?

Answer: _____

VOCABULARY BUILDING

A. Quality Control Terms

TASK 2. Study the following quality control terminology and complete the table with Indonesian meanings and example contexts.

No	Term	Indonesian Meaning	Context Example
1	Quality Control (QC)		The QC department checks all products before shipping.
2	Quality Assurance (QA)		QA ensures processes are designed to prevent defects.
3	Statistical Process Control (SPC)		SPC uses data to monitor production processes.
4	Control chart		The control chart shows process variation over time.
5	Defect		A defect was found on the product surface.
6	Non-conformance		Non-conformance must be reported immediately.
7	Root cause analysis		Root cause analysis identified the machine error.
8	Corrective action		Corrective action was taken to fix the problem.
9	Preventive action		Preventive action stops problems before they occur.
10	Acceptance criteria		Products must meet acceptance criteria to pass.
11	Inspection		Inspection is conducted at every production stage.
12	Sampling plan		The sampling plan determines how many units to test.
13	Calibration		Regular calibration ensures measurement accuracy.

No	Term	Indonesian Meaning	Context Example
14	Tolerance		The tolerance for this dimension is ±0.5mm.
15	Specification		The product meets all specifications.

B. Quality Management Methodologies

TASK 3. Complete the table with key features and purposes of each methodology.

Methodology	Key Features	Purpose
TQM		
Six Sigma		
Lean		
QFD		
FMEA		
Kaizen		

C. Vocabulary Application Exercise

TASK 4. Complete these quality-related scenarios with appropriate vocabulary from the list above.

1. During inspection, we found several _____ that did not meet the specifications.
2. The team conducted a _____ to identify why the machine kept producing defective parts.
3. We implemented _____ to prevent the problem from recurring.
4. The _____ shows that our process is stable and predictable.
5. Our company achieved ISO 9001 _____ last year.
6. The _____ helps us determine how many samples to inspect from each batch.

GRAMMAR FOCUS:

PASSIVE VOICE IN TECHNICAL WRITING

Passive voice is extensively used in technical and scientific writing because it emphasizes the action or process rather than the person performing it. In quality control contexts, passive voice is particularly useful for writing procedures, reports, and documentation (Swales & Feak, 2012).

A. Structure of Passive Voice

Tense	Active	Passive
Simple Present	The inspector checks the products	The products are checked (by the inspector)
Simple Past	The team identified the defect	The defect was identified (by the team)
Present Perfect	We have implemented new procedures	New procedures have been implemented
Future	The company will conduct an audit	An audit will be conducted
Modal	Engineers must verify the measurements	The measurements must be verified

B. When to Use Passive Voice in Quality Context

- When the action is more important than the doer: "The samples were tested for contamination."
- When the doer is unknown or obvious: "The defective parts were returned to the supplier."
- In formal reports and procedures: "All non-conforming products must be quarantined."

C. Common Passive Constructions in Quality Management

Active	Passive
The operator detected a defect	A defect was detected
We measure quality at each stage	Quality is measured at each stage
The company has certified the process	The process has been certified
Workers must follow the procedures	The procedures must be followed

GRAMMAR EXERCISES

Exercise 1: Change these active sentences to passive voice

1. The quality team inspects incoming materials daily.
   → _____
2. The supervisor approved the corrective action plan.
   → _____
3. We have documented all quality issues in the database.
   → _____
4. The laboratory will analyze the samples tomorrow.
   → _____
5. Inspectors must reject non-conforming products.
   → _____

Exercise 2: Complete the quality report sentences with passive voice

1. Three hundred units _____ (inspect) yesterday.
2. The root cause _____ (identify) during the investigation.
3. Corrective actions _____ (implement) by next week.
4. All employees _____ (train) on the new quality procedures.
5. The control chart data _____ (analyze) daily.

PHASE 3: PRACTICE & APPLICATION

TASK 5: CONTROL CHART INTERPRETATION

Analyze the following control chart scenario:

A production line manufactures bolts with a target diameter of 10mm. Control chart data shows:

- UCL (Upper Control Limit): 10.05mm
- Center Line: 10.00mm
- LCL (Lower Control Limit): 9.95mm
- Recent measurements: 10.03, 10.04, 10.05, 10.06, 10.07

Questions:

1. Is the process in control or out of control? Why?
   Answer: _____
2. What type of variation is this (common cause or special cause)?
   Answer: _____
3. What action should be taken?
   Answer: _____
4. What might be causing this trend?
   Answer: _____

PHASE 4: PRODUCTION

TASK6: WRITING A QUALITY ANALYSIS REPORT

Scenario:

You are a quality engineer analyzing a quality issue in a production line. Write a comprehensive Quality Analysis Report using the template below.

Given Data:

- Product: Smartphone cases
- Issue: Surface scratches
- Defect rate: Increased from 2% to 8% over last month
- Production volume: 10,000 units/month
- Customer complaints: 15 in last two weeks

QUALITY ANALYSIS REPORT

Report No: _____ Date: _____

Prepared by: _____

1. EXECUTIVE SUMMARY

[Brief overview of the issue and findings - 50 words]

_____

2. PROBLEM DESCRIPTION

Product: _____ Issue identified: _____

Time period: _____

3. DATA ANALYSIS

[Present defect data, trends, statistical analysis]

_____

4. ROOT CAUSE INVESTIGATION

Method used: [5 Whys / Fishbone / FMEA]

Primary cause: _____

Contributing factors: _____

5. CORRECTIVE ACTIONS

Short-term: 1. _____ 2. _____

Long-term: 1. _____ 2. _____

6. PREVENTIVE MEASURES

[Actions to prevent recurrence]

_____

7. CONCLUSION AND RECOMMENDATIONS

_____

TASK 7: GROUP PROJECT - QUALITY IMPROVEMENT PROPOSAL

Activity: Design a Quality Improvement Initiative

Instructions:

1. Form groups of 4-5 students
2. Choose a quality issue from your academic or work experience
3. Develop a comprehensive improvement proposal

Presentation Format (15 minutes):

- Problem Statement (2 min)
- Current State Analysis (3 min)
- Proposed Solution (5 min)
- Implementation Plan (3 min)
- Expected Results (2 min)

Deliverables:

- PowerPoint presentation (10-15 slides)

- Written proposal (500-750 words)
- Visual aids (charts, diagrams, flowcharts)

PHASE 5: AUTOMATIZATION, FLUENCY & ENRICHMENT

TASK 8: CASE STUDY ANALYSIS

Toyota's Quality Crisis (2009-2010)

Toyota, known for its superior quality and the Toyota Production System, faced a major quality crisis when millions of vehicles were recalled due to unintended acceleration issues. The crisis revealed several organizational problems including rapid expansion that compromised quality oversight, communication gaps between American operations and Japanese headquarters, delayed response to customer complaints, and over-confidence in existing quality systems. The crisis cost Toyota billions of dollars and damaged its reputation for quality excellence (Cole, 2011).

However, the company implemented comprehensive reforms: enhanced quality auditing processes, improved communication channels, created regional quality centers, strengthened customer feedback systems, and renewed emphasis on core TPS principles.

Analysis Tasks:

1. Root Cause Analysis (200 words): What were the underlying causes of the quality crisis? How did organizational culture contribute to the problem?
2. Quality System Evaluation (200 words): What weaknesses existed in Toyota's quality management system? Which quality control tools could have prevented this crisis?
3. Improvement Recommendations (200 words): Design a quality monitoring system to prevent similar issues. Include specific quality tools and methodologies.
4. Lessons Learned (100 words): What can other manufacturers learn from this case? How does this relate to quality management principles studied?

PHASE 6: REFLECTION & TRANSFER

Self-Assessment Checklist

Can you now:

- ☐ Define key quality management terms?
- ☐ Understand and follow procedure texts?
- ☐ Interpret quality control charts?
- ☐ Write a quality analysis report?
- ☐ Apply quality tools to real problems?
- ☐ Use passive voice correctly in technical writing?

Reflection Questions

1. Most Valuable Learning:

What concept or skill will be most useful in your future career? _____

2. Challenging Aspects:

What was most difficult to understand? _____

3. Real-World Application:

How will you apply quality management principles in your final project, internship, and future job?

_____