

# QUALITY TECHNIQUES I

## COURSE CONTENT

### SECTION 1

#### BASIC QUALITY CONTROL

##### 1.1 INTRODUCTION

- 1.1.1 Inspection
- 1.1.2 Quality Control
- 1.1.3 Quality Assurance
- 1.1.4 Quality Management

##### 1.2 MANAGING QUALITY

- 1.2.1 Planning
- 1.2.2 Organising
- 1.2.3 Leading
- 1.2.4 Controlling

##### 1.3 QUALITY IMPROVEMENT

##### 1.4 FITNESS FOR PURPOSE

- 1.4.1 Availability
- 1.4.2 Reliability
- 1.4.3 Maintainability
- 1.4.4 Field Service

##### 1.5 ORGANISATIONAL QUALITY POLICIES

- 1.5.1 Quality Policy Subjects
- 1.5.2 Adherence to Policies

##### 1.6 TOP MANAGEMENT SUPPORT

##### 1.7 ORGANISING AN IMPROVEMENT PROJECT

- 1.7.1 The Project Leader
- 1.7.2 Technical Support
- 1.7.3 Involvement of the Install and Run Team

## **1.8 PRODUCT LIABILITY**

## **1.9 QUALITY COSTING**

1.9.1 Reasons for Quality Costing

1.9.2 Quality Cost Categories

1.9.3 Collecting Cost Figures

1.9.4 Cost Presentation to Top Management

1.9.5 Interpreting the Quality Cost Summaries

1.9.6 Time Period for Cost Capture

1.9.7 Measuring Progress in Cost Reduction

1.9.8 The Control Phase

## **1.10 QUALITY WORK ELEMENTS AND JOBS**

1.10.1 Listing Elements

## **1.11 OPERATOR SELF-CONTROL**

## **1.12 THE PARETO PRINCIPLE**

## **1.13 COMPUTERS IN QUALITY**

## **1.14 ANALYSING A QUALITY COST PROJECT**

# **SECTION 2**

## **ELEMENTARY STATISTICS**

### **2.1 INTRODUCTION**

### **2.2 MEASURES OF CENTRAL TENDENCY**

2.2.1 Average (Mean)

2.2.2 Median

2.2.3 Mode

### **2.3 MEASURES OF SPREAD**

2.3.1 Range

2.3.2 Standard Deviation

### **2.4 PLOTTING DATA**

2.4.1 Frequency Distribution

2.4.2 Grouped Frequency Distribution

2.4.3 The Histogram

2.4.4 The Frequency Polygon

## **2.5 INTERPRETING THE SHAPE OF DATA**

2.5.1 Normal Distribution

2.5.2 Peaked (leptokurtic) Distribution

2.5.3 Skewed Distribution (log normal)

2.5.4 Bimodal Distribution

2.5.5 Triangular Distribution

2.5.6 Rectangular Distribution

2.5.7 Cooked Distribution

## **2.6 NORMAL DISTRIBUTION**

2.6.1 Normal Curve

2.6.2 Interpretation of Normal Distribution

2.6.3 Normal Curve use of Non-normal Variation Patterns

## **2.7 DATA COLLECTION**

## **2.8 STATISTICS AS A TOOL KIT**

## **2.9 METHODS OF SUMMARISING DATA**

2.9.1 Compiling a Grouped Frequency Distribution Table

2.9.2 Constructing a Histogram

## **SECTION 3**

### **3.1 PROCESS CAPABILITY STUDIES**

3.1.1 The Purpose of a Capability Study

### **3.2 PLANNING A MACHINE CAPABILITY STUDY**

### **3.3 THE SHAPE OF THE PROCESS**

3.3.1 Isolating the Process to be Studied

3.3.2 Determination of the Type of Data Required

3.3.3 Determination of Amount of Data Required

3.3.4 Designing the Data Collection Form

### **3.4 RUNNING A MACHINE CAPABILITY STUDY**

3.4.1 Testing for Normality

3.4.2 Probability Paper Plotting

### **3.5 PROCESS CAPABILITY INDICES**

## **SECTION 4**

### **4.1 GENERAL**

### **4.2 DATA USED FOR CONTROL CHARTS**

### **4.3 TYPES OF CONTROL CHARTS**

### **4.4 CONTROL LIMITS**

### **4.5 CONTROL CHART CONSTRUCTION**

4.5.1 Characteristic Choice

4.5.2 Specifying the Chart

4.5.3 Chart Lines

4.5.4 Sample Selection

4.5.5 Sampling for Process Control

4.5.6 Sampling Frequency

4.5.7 Workshop Charts

### **4.6 A CHART TO ATTAIN CONTROL**

### **4.7 AVERAGE AND RANGE CHARTS**

4.7.1. Control Limits for Sample Averages

### **4.8 SHEWHART CHART INTERPRETATIONS**

4.8.1 Averages and Ranges

## **4.9 ATTRIBUTE CONTROL CHARTS**

4.9.1 Fraction and Percent Defective (p charts)

4.9.2 Number Defective Charts

4.9.3 Defects per Unit Charts

## **4.10 CONTROL CHARTS FOR ESTABLISHED PROCESSES**

## **4.11 CONTROL TO A KNOWN STANDARD**

# **SECTION 5**

## **5.1 ACCEPTANCE SAMPLING**

## **5.2 ATTRIBUTES AND VARIABLES**

## **5.3 SAMPLING BENEFITS**

## **5.4 ASSUMPTIONS MADE IN SAMPLING PLANS**

## **5.5 DEFINITION OF A BATCH (LOT)**

## **5.6 INDIVIDUALS AND BULK SAMPLES**

## **5.7 CLASSIFICATION OF IMPORTANCE OF DEFECTS**

## **5.8 BATCH SIZE SELECTION**

## **5.9 SINGLE SAMPLING**

## **5.10 DOUBLE SAMPLING**

## **5.11 MULTIPLE SAMPLING**

## **5.12 SELECTING THE SAMPLE**

5.12.1 Random Sampling

5.12.2 Stratification of Samples

**5.13 SAMPLING RISKS**

**5.14 OPERATING CHARACTERISTIC (OC) CURVE**

**5.15 CONSTRUCTING AN OC CURVE**

**5.16 SELECTION OF AN ACCEPTABLE QUALITY LEVEL (AQL)**

**5.17 AVERAGE OUTGOING QUALITY LIMIT (AOQL)**

5.17.1 Calculating the AOQL

5.17.2 Graphical Display of AOQL

**5.18 SAMPLING BY VARIABLES**

5.18.1 The Lot Plot Method

**Additional:**

**ISO 9001:2015**

**STANDARDS IN QUALITY REGULATION**