MECHANICAL INSPECTION

COURSE CONTENT

SECTION 1

HISTORY

1.1 GENERAL

1.2 INSPECTION IN AN ORGANISATION

1.3 DESCRIBING THE INSPECTION ROLE

1.4 SPECIFYING THE INSPECTION PROCESS

1.5 METHODS, MEASUREMENT, AND PERSONNEL

1.6 INSPECTION STATIONS

1.7 PATROL INSPECTION

1.8 FIXED STATION INSPECTION

1.9 INSPECTION PROCEDURES

- 1.9.1 Goods-inward Inspection
- 1.9.2 Set-up Inspection
- 1.9.3 First piece Inspection
- 1.9.4 In-process Inspection
- 1.9.5 Sampling Inspection

SECTION 2

RECORDS

2.1 INSPECTION REPORTS

2.2 TEST DATA

2.3 QUALIFICATION TESTING

2.4 EVALUATION REPORTS

2.5 AUDIT REPORTS

2.6 MATERIAL REVIEW REPORTS

2.7 CALIBRATION DATA

2.8 QUALITY COST REPORTS

2.9 REPORTING TECHNIQUES
2.9.1 Users
2.9.2 Manager
2.9.3 Specialists
2.10 THE FOG INDEX
2.11 FORMAL REPORT LAYOUT

SECTION 3
ACCURACY, PRECISION, AND RELIABILITY

3.1 PRECISION
3.2 ACCURACY
3.3 RELIABILITY
3.4 MEASUREMENT ERROR
3.5 INSPECTOR EFFICIENCY

SECTION 4
DECIMAL NUMBERS

4.2 WHOLE NUMBERS
4.3 DECIMAL IDENTIFICATION
4.4 ADDITION AND SUBTRACTION
4.5 MULTIPLICATION AND DIVISION

SECTION 5
SI LENGTHS

5.1 LENGTH STANDARDS
5.2 USEFUL WORKSHOP FORMULAE
5.3 AREA ESTIMATION BY SHAPES
5.4 AREA BY THE MID ORDINATE METHOD

SECTION 6

THE STEEL RULE

6.1 GENERAL

6.2 THE RULE DESCRIBED

6.3 USES FOR THE RULES

6.4 USING THE RULE

6.5 MEASURING PROCEDURES

- 6.5.1 Measuring Length or Width
- 6.5.2 Measuring Thickness of Height
- 6.5.3 Measuring Outside Diameter
- 6.5.4 Measuring Inside Diameter
- 6.5.5 Measuring Hole Depth
- 6.5.6 Centre-line Determination
- 6.5.7 Rolled Steel Section Measurement

6.6 CARE OF THE RULE

SECTION 7

TOLERANCES

7.1 GENERAL

7.2 THREE TYPES OF FIT

- 7.2.1 Interference
- 7.2.2 Clearance
- 7.2.3 Transition

7.3 TOLERANCE ZONES

- 7.3.1 Unilateral Tolerance
- 7.3.2 Bilateral Tolerance
- 7.3.3 Basic Hole System
- 7.3.4 Basic Shaft System

7.4 GEOMETRIC TOLERANCES

SECTION 8

GAUGING PRINCIPLES

8.1 GENERAL
8.2 PLUG GAUGE
8.3 RING GAUGE
8.4 GAP GAUGE
8.5 TAPER GAUGE
8.6 PIN GAUGE
8.7 SCREW PLUG GAUGE
8.8 SCREW RING GAUGE
8.9 SCREW THREAD CALIPER

SECTION 9

SURFACE FINISH ASSESMENT

9.1 LAY
9.2 SAMPLING LENGTH
TRANSVERSING LENGTH
9.3 CENTRE LINE AVERAGE HEIGHT (CLA)

SECTION 10

THE VERNIER CALIPER

10.1 READING THE VERNIER CALIPER
10.2 THE MICROMETER CALIPER
10.3 MEASURING PRICIPLE
10.5 DIAL INDICATORS

SECTION 11

GAUGE BLOCKS

11.1 MATERIAL FOR GAUGE BLOCKS

11.2 WRINGING

11.3 CARE OF BLOCKS

11.4 A METRIC GAUGE BLOCK SET

A CERAMIC GAUGE BLOCK SET

11.5 BUILDING A DIMENSION

11.6 PRINCIPLE USES OF GAUGE BLOCKS

11.7 CALIBRATION OF OTHER INSTRUMENTS and LESSOR STANDARDS

11.8 SETTING OF COMPARARTORS and INDICATING INSTRUMENTS

11.9 ATTIRBUTE GAUGING

11.10 MACHINE SETTINGS and PRECISION ASSEMBLIES

11.11 LAYOUT

SECTION 12

ENGINEERING DRAWINGS

SECTION 13

ANGULAR MEASUREMENT

13.1 SEXAGESIMAL SYSTEM

13.2 CENTESIMAL SYSTEM

13.3 RADIAN MEASURE

13.4 GEOMETRY

13.4.1 Parallel Lines

13.4.2 Isosceles Triangle

13.4.3 Equilateral Triangle

13.4.4 Right Angle Triangle

13.4.5 Interior Angles of a Triangle

13.5 THEOREM OF PYTHAGORAS

13.6 TRIGONOMETRY

13.7 SINE BAR

13.8 DIVIDING THE CIRCLE

SECTION 14

TRIGONOMETRY

14.1 THE SINE

14.2 THE COSINE

14.4 THE THEOREM OF PYTHAGORAS

14.5 THE SINE RULE

14.6 THE COSINE RULE

SECTION 15

SURFACE MEASUREMENT

15.1 RANK TAYLOR HOBSON TALYSURF

15.2 PERTHOMETER

15.3 ANALYSIS OF SURFACE TRACES

15.4 PEAK TO VALLEY HEIGHT

15.5 CENTRE LINE AVERAGE METHOD (R_a)

SECTION 16

REFERENCE SURFACES

16.1 PRINCIPLES OF USE

16.2 SURFACE PLATE METHODS

16.3 PHYSICAL CHARACTERISTICS

16.4 TYPES OF SURFACE PLATES

16.4.1 Cast Iron

16.4.2 Granite

16.4.3 Wear Properties

16.5 CARE AND USE OF SURFACE PLATES

16.5.1 Surface Table Work

SECTION 17

MATERIALS TESTING

17.1 TENSION and COMPRESSION

17.2 NORMAL STRESS

17.3 NORMAL STRAIN

17.4 TEST SPECIMENS

17.5 STRESS – STRAIN CURVES

17.6 BENDING STRENGHT

17.7 BUCKLING STRENGTH

17.8 SHEARING

17.9 TORQUE

17.10 HARDNESS TESTING

17.11 SCRATCH TESTING

17.12 BRINELL HARDNESS TEST

17.13 VICKERS PRINCIPLE

17.14 VICKERS PYRAMID HARDNESS TESTING MACHINE

17.15 ROCKWELL HARDNESS TESTING

17.16 SCLEROSCOPE

SECTION 18

CALIBRATION

18.1 IN – HOUSE CALIBRATION

18.2 MEASURING EQUIPMENT IDENTIFICATION

18.3 CALIBRATION RECORDS

18.3 JIGS and FIXTURES