MODULE 6. MATERIALS AND HARDWARE

6.1 Aircraft Materials — Ferrous

(a) Characteristics, properties and identification of common alloy steels used in aircraft;
Heat treatment and application of alloy steels;

(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.

6.2 Aircraft Materials — Non-Ferrous

(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft;
Heat treatment and application of non-ferrous materials;

(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.

6.3 Aircraft Materials - Composite and Non- Metallic

6.3.1 Composite and non-metallic other than wood and fabric

(a) Characteristics, properties and identification of common composite and nonmetallic materials, other than wood, used in aircraft; Sealant and bonding agents.

(b) The detection of defects/deterioration in composite and non-metallic material.
Repair of composite and non-metallic material.

6.3.2 Wooden structures

Construction methods of wooden airframe structures;
Characteristics, properties and types of wood and glue used in aeroplanes;
Preservation and maintenance of wooden structure;
Types of defects in wood material and wooden structures;
The detection of defects in wooden structure;
Repair of wooden structure.

6.3.3 Fabric covering

Characteristics, properties and types of fabrics used in aeroplanes;
Inspections methods for fabric;
Types of defects in fabric;
Repair of fabric covering.

6.4 Corrosion

(a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;

(b) Types of corrosion and their identification;
Causes of corrosion;
Material types, susceptibility to corrosion.

6.5 Fasteners

6.5.1 Screw threads

Screw nomenclature;
Thread forms, dimensions and tolerances for standard threads used in aircraft;
Measuring screw threads;

6.5.2 Bolts, studs and screws

Bolt types: specification, identification and marking of aircraft bolts, international standards;
Nuts: self-locking, anchor, standard types;
Machine screws: aircraft specifications;
Studs: types and uses, insertion and removal;
Self-tapping screws, dowels.

6.5.3 Locking devices

Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, cotter pins.

6.5.4 Aircraft rivets

Types of solid and blind rivets: specifications and identification, heat treatment.

6.6 Pipes and Unions

(a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;

(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.

6.7 Springs

Types of springs, materials, characteristics and applications.

6.8 Bearings

Purpose of bearings, loads, material, construction;
Types of bearings and their application.

6.9 Transmissions

Gear types and their application;
Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;
Belts and pulleys, chains and sprockets.

6.10 Control Cables

Types of cables;
End fittings, turnbuckles and compensation devices;
Pulleys and cable system components;

Bowden cables;
Aircraft flexible control systems.

6.11 Electrical Cables and Connectors

Cable types, construction and characteristics;
High tension and co-axial cables;
Crimping;
Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.