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Section 7 AIRFRAME GENERAL

THIS MODULE CONTAINS A BASIC KNOWLEDGE SELF STUDY GUIDE AND SUGGESTED MAINTENANCE TASKS

Module 7L – AIRFRAME GENERAL BASIC THEORETICAL KNOWLEDGE (self study guide)
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See Section 1 Instructions for use

Module 7L.1 Flight control system (Level 3)	Completed,
Cockpit controls Controls in cockpit, colour markings, knob shapes Flight control surfaces Flaps, air brakes surfaces, hinges, bearings, brackets, push-pull rods, bell cranks, pulleys, chains, tubes, rollers, tracks, jack screws, surfaces, movements, lubrication, stabilisers, balancing of controls Flight controls Ailerons, flaps, spoilers/air brakes, elevators, rudder. Description and operation Flight controls; hinges, bearings, brackets, cables, push-pull rods. Description and operation Wings and Stabilisers Wings, wing extensions, winglets, tailplane, fin General Mass balance and weight of controls, free play limits in control systems and hinges Control deflections and recording Flying control cable types and sizes, pulleys, fairleads, types of terminal, adjustment Combination of controls; flap ailerons, flap air brakes Trim systems description and applications Lubrication of flying controls, use of correct lubricants	

Module 7L.2 Airframe (Level 2)	Completed,
Landing gear general Characteristics of landing gears and shock absorber strut, extension, brakes, drum, disc, wheel tyre, retraction mechanism, electrical retraction, emergency Landing gear Types of landing gear and shock absorbing methods Landing gear retraction and extension methods, indication and emergency extension Wheel up landing warning Wheels; types of wheel, tube and tubeless types. Damage and deterioration inspections, common faults. Precautions. Allowable wear Brakes	

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Types of wheel brake, drum, disc and inspections. Types of braking friction material and hydraulic fluid used. Adjustment and bleeding methods
Identify hazards associated with inflated wheels and tyres and precautions
Identify various types of hydraulic brake connections
Brake disc and drum inspections and allowable wear
Brake friction material wear and contamination. Replacement criteria
Airbrake/wheel brake combined operation

Nose wheel

Types, steering methods

Tail wheel

Fixed and retracting, heavy tailwheels, additional maintenance requirements, castoring/steering

Structure

Wing to fuselage mounting points, empennage (fin and tail plane) to fuselage mounting points, control surface mounting points

Permissible maintenance measures and repairs

Towing and lifting

Towing/lifting equipment/mechanism jacking and lifting points, trestle aircraft, safety precautions

Cabin

Seats and safety harness, cabin arrangement, windshields, windows, placards, baggage compartment, cockpit controls, cabin air systems, blower

Water ballast

Water reservoirs, lines, valves, drains, vents, tests

Fuel system

Tanks, lines, filters, vents, drains, filling, selector valve, pumps, indication, tests, bonding

Hydraulics

System layout, accumulators, pressure and power distribution, indication

Liquid and gas; hydraulic, other fluids, levels, reservoir, valves, filter

Protections

Firewalls, fire protection, lightning strike bonding, turnbuckles, locking devices, dischargers

Aerotowing

Types of tow release units, cockpit control shape and colour, weak links, cable retractor systems, required placards. TBO limits on some tow release units

Module 7L.3 Fasteners (Level 2)

Completed,

Reliability of pins, rivets, screws, identification of fasteners, nuts, bolts, screws, rivets and uses

Control cables, turnbuckles, adjustment method, locking. Cable inspection methods and precautions

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Quick-release couplings (L'Hotellier, SZD, Poland), type identification and limitations.
Inspection requirements

Module 7L.4 Locking equipment (Level 2)

Completed,

Admissibility of locking methods, locking pins, spring steel pins, locking wire, stop nuts, split/cotter pins, paint marking
Quick-release couplings locking methods and inspection
Single use nuts and fasteners.
Locking wire and tell-tale wire applications

Module 7L.5 Weight and balance levelling (Level 2)

Completed,

Reasons for accurate weight and balance, aircraft and sailplane levelling points and weighing attitude
Methods of weighing and weighing equipment. Equipment calibration
Location of weighing data. Min/max seat loadings
Documents and calculations required. Placards in cockpit
Definition of total weight and weight of non-lifting parts and rational
Weighing condition and equipment list

Module 7L.6 Rescue systems (Level 2)

Completed,

Ballistic recovery system overview

Module 7L.7 On-board modules (Level 2)

Completed,

Pitot-static system, vacuum/dynamic system. Hydrostatic test Pitot head, static ports, total energy probe, combination probes. Description and operation
Flight instruments; airspeed indicator, altimeter, vertical-speed indicator, connection and functioning, markings
Arrangement and display, panel, electrical wires ergonomic layout
Calibration and leak testing of pitot static instrument systems requirements
Gyroscopes, filters, indicating instruments, testing of function
Magnetic compass; installation and compass swing Degaussing metal airframe parts
Sailplanes; acoustic vertical-speed indicator (Vario), flight recorders, anticollision aids
Oxygen system Hydrostatic test for installed oxygen cylinders

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Module 7L.8 On-board modules installations and connections (Level 2)	Completed,
Flight instruments, mounting requirements (emergency landing conditions as per CS-22)	
Electrical wiring Power sources, types of storage batteries, electrical parameters, electrical generator, circuit breaker, energy balance, earth/ground, connectors, terminals, warnings, fuses, lamps, lighting, switches, voltmeters, ampere meters, electrical gauges	
Electrical system Wiring requirements and circuit protection. Size of cables, type of insulation, screening, routing and protection, types of fuse or circuit breakers	
Batteries Types of battery, security of mounting, overload protection, charging, required maintenance and testing	
Types of cable terminals and crimping methods, solder connections	
Electrical system gauges Ammeter, volt meter. Describe advantages and disadvantages of each	
Charging systems, driven alternator (or Dynamo) coil alternators	
Lights Internal and external lights, hi-voltage strobe lights, LED strobe lights, strobe power units, switches	
Electrical test equipment Multi-meter, continuity tester, insulation tester, bonding tester, battery testers	

Module 7L.9 Piston engine propulsion (Level 2)	Completed,
Interface between power plant and airframe Engine mounting structure, possible faults, damage identification, inspections following incidents	

Module 7L.10 Propeller (Level 2)	Completed,
Inspection Identification of the different propeller types; fixed, 2/3 position, constant speed, folding, retracting Replacement Safety precautions working with propeller driven aircraft Balancing principal	

Module 7L.11 Retraction system (Level 2)	Completed,
Propeller position control, engine bay doors and opening/closing mechanisms Engine and/or propeller retraction system, Identify components in the propeller/engine retraction system	

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Module 7L.12 Physical inspection procedures (Level 2)	Completed,
<p>Cleaning, use of lighting and mirrors Use of magnifying glass and borescope equipment Measuring tools Micrometres, vernier callipers, rules, go/no-go gauges Measure of controls deflection Angular and linier measurements, free play, stiffness/friction Torque of screws and bolts Understanding metric and imperial systems and various torque presentations General wear Wear of bearings and bushings; wear indications, where to find allowable limits Inspection equipment Types of equipment (Height gauge, straight edge, Dial Test Indicator (DTI), measure tape, thermometer, tensiometer) describe applications Calibration of measuring tools, why is calibration important Use of Non Destructive Testing (NDT) its uses and limitations. Various types and personnel privileges and restrictions</p>	

Module 7L – AIRFRAME GENERAL SUGGESTED MAINTENANCE TASKS		
Registration & date	Maintenance task performed	Confirmed by Licence No.
General activities		
	1 st Annual/100 hour inspections of a sailplane or aircraft	
	2 nd Annual/100 hour inspection of a sailplane or aircraft	
	3 rd Annual/100 hour inspection of a sailplane or aircraft	
	4 th Annual/100 hour inspection of a sailplane or aircraft	
	5 th Annual/100 hour inspection of a sailplane or aircraft	
Note; At least 3 of the 5 Annual/100 hour inspections should be on aircraft of the most complex type sought		
	Placards check or replace	
	Weighing, weight & balance sheet	
	Documentation of annual inspection, repair	

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	Review records for compliance with airworthiness directives	
	Carry out colour contrast NDT crack inspection	
	Carry out aircraft general lubrication	
	Demonstrate use of measuring equipment (micrometer, vernier calliper, torque wrench)	
	Inspection after an occurrence	
	Dismantling/reinstallation (de-rig/rig) of wings and empennages	
	Carry out post rigging essential inspections	
	Lock wire nuts/bolts	
	Install tell-tale wire on emergency release	
Levelling and weighing		
	Level the sailplane or aircraft into weighing position	
	Carry out weighing	
	Weighing, weight and balance sheet, produce weighing report	
	Prepare a weight and balance amendment following modification or equipment change	
	Prepare a weight and balance report (without the use of computer program) using moments	
	Check the list of equipment	
Flight controls and flight control systems		
	Aileron, flaps: removal/balancing/reinstallation	
	Elevator: removal/balancing/reinstallation	
	Rudder: removal/balancing/reinstallation	
	Carry out weight and mass balance check of a flying control	

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	Rudder or other Flying control cable: Fabrication and installation	
	Elevator pushrod: Installation	
	Carry out L'Hotellier coupling inspection	
	Safeguarding of pins, screws, castellated nuts	
	Sealing of gaps	
Electrical systems		
	Electrical components, wiring: removal/installation	
	Use of multimeter for circuit testing	
	Carry out wiring continuity and voltage drop test	
	Replace damaged wire	
	Replace circuit breaker in panel	
	Replace blown navigation light bulb	
	Install/replace a selection of crimp terminals	
	Solder wires onto a switch or lamp	
	Replace aircraft battery	
	Batteries — Servicing and charging	
	Carry out battery capacity test or Li-Ion voltage test	
	Check battery charging system	
Cabin equipment/systems		
	Belts/safety harnesses: Removal/inspection/Installation	
	Oxygen system component removal installation and Test	

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	Canopy replacement or repair	
	Repair crack in transparency	
	Pitot/static system: Removal/Installation/test leak test and rectification	
	Flight instruments: Removal/installation remove for calibration or repair, refit and test	
	Installation of approved equipment	
	Compass: Installation — Compensation Inspect and verify correction card date and legibility	
	Carry out compass compensation	
	Tow release: Removal/installation Inspect tow release and operating system	
	Replace sailplane nose release unit	
	Replace sailplane C of G release unit	
	Inspect tow release retractor system and test	
	Replace tow cable weak link	
	Water ballast system: Removal — Installation — Test Inspect plumbing and valves, replace leaking valve, test filling and dump operation	
	Replace water ballast tank	
	Undercarriage: Removal — Installation Remove main landing gear, inspect/service/repair reinstall and test	
	Remove nose/tail landing gear inspect/service/repair reinstall and test	
	Replace tyre and tube	
	Brake system: Replacement of components Inspect and replace worn brake pads or shoes	
	Replace brake disc	
	Replace or repair faulty brake master cylinder	

