1 APPENDIX R62.20
NATIONAL PILOT LICENCE
TOURING MOTOR GLIDER.
PRACTICAL TRAINING

1. Aim of training course

The aim of the course is to train a candidate to the level of proficiency required for the issue of a type rating for touring motor gliders, and to provide the training necessary to act as pilot-in-command of any touring motor glider for which he or she holds a valid type rating, engaged in non-revenue flights under visual flight rules.

2. Practical training course

Exercise 1: Familiarization with the motor glider

Aim: To become familiar with the component parts, controls and system of the airplane.

(1) Explanation of the motor glider
(2) Cockpit layout
(3) Systems
(4) Check lists, drills, controls; and
(5) Emergency drills, consisting of –
    (a) Action in the event of fire on the ground and in the air;
    (b) Equipment or system failures; and
    (c) Escape drills.

Exercise 2: Preparation for, and action after flight

Aim: To understand how to prepare the aircraft and pilot for flight, and how to leave the aircraft after flight.

(1) Local rules
(2) Flight authorization and motor glider acceptance
(3) Serviceability documents
(4) Required equipment, maps, etc.
(5) External checks
(6) Internal checks
(7) Seat, harness and controls adjustment
(8) Deployment and retraction of spoiler/ Airbrake system
(9) Starting and warming-up checks including safety, people, animals, aircraft and air law
(10) Seating position – suitable clothing
(11) Starting and warming-up checks
(12) Power checks
(13) Running down and switching off of engine
(14) Parking, security and picketing
(15) Completion of authorization and flight folio sheets

Exercise 3: Air Experience

Aim: The aim of this sequence is to instill confidence in a learner who has previously flown very little or not at all, to impart some knowledge, and to familiarize the learner with the geography around the training base.

Exercise 4: Effect of controls

Aim: To understand how each control affects the aircraft in flight.

(1) Methods of assessing aircraft attitude
(2) Primary effects when laterally level and when banked
(3) Further effects of aileron and rudder – effects of –
    (a) airspeed
    (b) slipstream
    (c) power changes
    (d) trimming of controls
    (e) flaps and / or spoiler/Airbrake systems
    (f) other controls, as applicable
(4) Use of engine controls
(5) Airmanship (look out)

Exercise 5: Taxiing

Aim: To safely control the airplane while maneuvering on the ground in different wind conditions and on different surfaces.

(1) Pre-taxi checks
(2) Starting, control of speed, and stopping
(3) Engine handling
(4) Control of direction and turns
(5) Turns in confined spaces
(6) Tail-wheel considerations (if applicable)
(7) Parking area procedure and precautions taking special note of wingspan
(8) Effects of wind and use of flying controls
(9) Effects of ground surface
(10) Freedom of rudder movement
(11) Marshalling signals
(12) Instrument checks
(13) Air traffic control procedures
(14) Emergencies (brake and steering failure)
(15) Airmanship (look out)
(16) Obstacle clearance with specific reference to wingspan and low wings.

Exercise 6: Straight and level flight

Aim: To attain and maintain flight in a straight line and at a constant altitude.

a. At normal cruising power, attaining and maintaining straight and level flight
b. Demonstration of inherent stability
c. Control in pitch, including use of trim
d. Lateral level, direction and balance, trim
e. At selected airspeeds (use of power)
f. During speed and configuration changes
g. Use of instruments
h. Airmanship (look out)

Exercise 7: Climbing

Aim: To enter and maintain a steady full-power climb and then return to level flight at a predetermined altitude, and to enter and maintain a steady cruise-climb.

(1) Entry, maintaining the normal and maximum rate climb and leveling off, with and without flaps (if applicable)
(2) Leveling off at selected altitudes
(3) *En route* (cruise) climb
(4) Attitude @ max angle of climb, and in various configurations
(5) Use of instruments
(6) Airmanship (look out)

Exercise 8: Descending

Aim: To enter and maintain a steady glide-descent and then, at a predetermined altitude, to return to level flight or to climb, and to enter and maintain a steady cruise descent.

(1) Entry, maintaining and leveling off
(2) Leveling off at selected altitudes
(3) Glide, powered and cruise descent (including effect of power and airspeed)
(4) Use of instruments.
(5) Side-slipping
(6) Airmanship (look out)
(7) Never exceed speeds for flaps, particularly for positive settings.

Exercise 9: Medium Turns

Aim: To enter and maintain a medium (up to approximately 30_o bank angle) turn whilst maintaining level flight and then to return to straight and level flight on a new predetermined heading.

(1) Entry and maintaining medium level turns
(2) Resuming straight and level flight
(3) Faults in the turn – skid /slip
(4) Turns onto selected headings, use of either gyro heading indicator or compass
(5) Use of instruments
(6) Airmanship. (Look out)
(7) Speed and attitude control

Exercise 10: Stalling

Aim: To recognise and enter a fully-developed stall from various modes of flight both straight and turning, and to recover with minimum height-loss to a safe flight mode; to become familiar with the 'feel' of the aeroplane in slow flight just above the stall speed; and to recognise the symptoms of the incipient stall and to restore the aeroplane to safe flight before the stall occurs.

A. Slow flight

The objective is to improve the learner's ability to recognise the symptoms of critically low speeds that could lead to a stall and or spin, and provide practice in maintaining the aeroplane in balance should this situation occur.

(1) Safety checks
(2) Introduction to slow flight and the indicators thereof: -
2.1 Attitude
2.2 Airspeed
2.3 Buffeting
2.4 Noise or lack thereof
2.5 Reduction of response to control inputs
(3) Controlled flight
a) Clean at stall speed plus 10 MPH
b) Full flaps at stall speed plus 10 MPH
(4) Application of full power with correct attitude to achieve flying speed, correcting for torque and pitch
(5) Airmanship. (Look out)

B. Stalling

(1) Airmanship (look out)
(2) Safety checks (look out)
(3) Symptoms
(4) Recognition
(5) Clean stall and recovery without power and with power and with various Flap settings.
(6) Recovery when a wing drops.
(7) Approach to stall in the landing configuration, with and without power, recovery at the incipient stage
(8) After engine failure while climbing steeply at full power

Exercise 10: Medium Turns

Aim: To enter and maintain a medium (up to approximately 30o bank angle) turn whilst maintaining level flight and then to return to straight and level flight on a new predetermined heading.

(1) Entry and maintaining medium level turns
(2) Resuming straight and level flight
(3) Faults in the turn – balance
(4) Turns onto selected headings, use of either gyro heading indicator or compass
(5) Use of instruments
(6) Airmanship.

Exercise 11: Descending and Climbing Turns

Aim: To enter and maintain a medium (up to approximately 30o bank angle) turn whilst maintaining a climb or descent, or to enter and maintain a turn from a straight climb or descent.

Note: Ideally, climbing turns should not exceed 15 deg bank angles, to optimize rate of climb**.**

(1) Entry and maintaining medium descending and climbing turns
(2) Resuming straight and level flight
(3) Faults in the turn - balance
(4) Turns onto selected headings, use of either gyro heading indicator or compass
(5) Use of instruments
(6) Airmanship. (Look out)

Exercise 12: Take Off and Climb to Downwind Position

Aim: To safely take-off and climb the airplane to position on the downwind leg at circuit height; to land safely in the event of an engine failure after take-off or at any time in the circuit; and to decide against continuation of the take-off – taking the appropriate action – if for some reason continuation would be unsafe.

(15) Pre-take-off checks
(16) Factors affecting the length of the take-off roll and the initial climb
(17) Into wind take-off
(18) Nose wheel / tail wheel considerations
(19) Drills during and after take-off
(20) Short take-off and soft-field procedures / techniques, including performance calculations
(21) Undulating (rough field) considerations
(22) Abandoned take-off
(23) Engine failure after take-off (EFATO) up to early downwind –specific to Touring Motor Glider

Note: a solo student may not practice this exercise!

(25) Airmanship (look out)

Exercise 13: Circuit, Approach and Landing

Aim: To fly an accurate circuit and carry out a safe approach and landing.

(1) Circuit procedures, downwind, base leg, key points visual angle to runway
(2) Powered and non Powered approach and landing
(3) Nose wheel / tail wheel considerations
(4) Effect of wind on approach and touchdown speeds, use of flaps or Spoiler or Airbrakes (if applicable)
(5) Glide approach and landing
(6) Short-landing and soft-field procedures / techniques /slope
(7) Missed approach / go-around
(8) Correcting bad approaches

-Hot and High
- Low and slow.
- Danger of full flap and high power approaches (lack of roll authority)

(9) Noise abatement procedures

(10) The hold-off period and touchdown
(11) Effect of ground surface and slope on the landing run
(12) Use of brakes (if applicable)
(13) Control during ground run
(14) Airmanship (look out)

Exercise 14 – Spin awareness & developed spin recovery

Aim: To understand and recognize the onset of situations that may lead to an inadvertent spin, and to learn how to instinctively take the necessary control actions to effect a recovery back to normal flight condition before a spin occurs; i.e.: to recover at the incipient stage and from fully developed spins.

(1) Cause of spin –control inputs (cross-controlled)
(2) Recognition of incipient spin
(3) Recovery from the incipient spin
(4) Recognition of developed spin and its direction
(5) Recovery from a developed spin
(6) Airmanship (look out)

Exercise 15: First Solo

Aim: To carry out a safe and accurate solo circuit, approach and landing.

One circuit only. Then full stop.

The student must be checked out for first solo by a Grade A or Grade B instructor, and if possible is in full-uninterrupted radio contact with the student during the entire first solo exercise.
Before flying solo a learner must:
c) In addition to being proficient in exercises 1 to 14
d) Be able to reasonably execute a simulated emergency landing from any position in the circuit.
e) He or she must also have completed a minimum of 8 (eight) hours of dual instruction. ~~or in the case of he or she holding a NPL glider rating or PPL or higher licence then the requirement will be 2(two) hours of dual instruction.~~ Not for SSSA to decide, this will be under crediting of flight time
f) He or she must be the holder of a valid Student Pilot license and have successfully passed the required exams.

During the next ~~1 (one) hour~~ 3 (hours) of solo flight, the student must remain in the circuit, consolidating Exercise 12 and 13. The student must receive a dual checkout for each of these three hours, ~~on completion of the aforementioned time~~, and, if possible, the supervising instructor must remain in full, uninterrupted radio contact with the student during this time.

Exercise 16: Side-slipping

Aim: The learner should be shown and become convinced of the effect of sideslipping on the relationship between heading and ground path. How this out-of-balance maneuver can be used to increase the rate of descent for a given airspeed and its usefulness in crosswind

landings. (While the learner is learning how to use the controls during a sideslip, the exercise should be performed at altitude.)

(1) Effects of controls in a sideslip
(2) Principles involved
(3) Types of sideslips (limitations of long wingspan in sideslipping)
(4) How exercise applies to flying
(5) Airmanship (look out)

Exercise 17: Steep Turns

Aim: To carry out a coordinated level turn at steep angles of bank and to recognize and recover from a spiral dive and to avoid wake turbulence.

(1) Steep 360 ^{o} turns (up to 45^{o} bank angle) maintaining altitude, recovering to straight and level flight.

(2) Steep descending turns (up to 60^{o} bank angle), completing a minimum of 2 complete orbits, without engine power and without entering spiral dive, then recovering to straight and level flight.

(3) Wake turbulence / disorientation

(4) Stalling in the turn and recovery

(5) Recoveries from unusual attitudes, including spiral dives

(6) Airmanship

Exercise 18: Use of instruments

Aim: To develop the habit of checking constantly both navigational and engine instruments in flight whilst keeping a good lookout for other aircraft.

(1) Flight instruments including navigation instruments

(2) Engine instruments

(3) Scanning techniques

(4) GPS and other basic electronic navigation systems

(5) Airmanship (look out)

Exercise 19: Low flying

Aim: To safely operate the airplane at heights lower than those normally used.

(1) Emphasis on regulations governing low flying
(2) Low-level familiarization
(3) Effect of drift
(4) Effect of wind on ground speed
(5) Effect of wind in inducing apparent skids and slips in turns
(6) Joining circuit in poor weather; (from low cloud base)
(7) Bad-weather circuit
(8) Airmanship (look out)

Exercise 20: Crosswind Take-off and Landing

Aim: To be able to handle both cross-wind take-offs and landings, including downwind landings in an emergency; to be able to input the correct mount of control to correct drift to ensure the track is a continuation of the take-off and landing path of the aeroplane.

(1) Aerodynamic and control inputs
(2) Cross-wind take-offs
(3) The circuit
(4) Approach and cross-wind landings
- Crabbing method
- Slipping method

(5) Flight manual limitations.
(6) Airmanship (look out)

Exercise 21: Precautionary landings

Aim: A precautionary landing is one not contemplated before the flight commenced and where engine power is still available, enabling the pilot the opportunity of selecting and inspecting a suitable landing area before executing a landing in an unfamiliar place.

(1) Situations necessitating a precautionary landing

(2) Full procedure away from aerodrome to break-off height

(3) Landing area selection -

(a) Normal aerodrome;
(b) Disused aerodrome
(c) Ordinary field.
(d) habitation for after landing assistance
(e) Other

(5) Inspection of landing area
(6) Circuit and approach
(7) PAN call
(8) Actions after landing
(9) Airmanship (look out)

Exercise 22 - Forced landing

Aim: To carry out a safe descent and landing in the event of the engine failing during flight.

Note: This exercise to be practiced at the training airfield, and commenced outside of the circuit pattern.

(1) Forced-landing procedure
(2) Choice of landing area, provision for change of plan
(3) Gliding distance

(4) Descent plan
(5) Key positions
(6) Engine cooling
(7) Angle (azimuth) to chosen landing area
(8) Use of radio, Mayday call
(9) Base leg
(10) Final approach
(11) Landing
(12) Actions after landing
(13) Airmanship (look out)

Exercise 23: Action in Event of Fire

Aim: Fire is extremely rare in modern motor gliders but it is essential that a pilot has a thorough knowledge of the procedures to be adopted in his or her particular type of airplane in order to extinguish a fire both on the ground and in the air.

(1) Identification of fire source and type (white smoke for electrical /black for fuel and oil as a general rule).
(2) Isolation of fuel and electrics/ extinguishing of fire
(3) Flight procedures / emergency actions (use remaining fuel in carburetor)
(4) Fly abnormal attitude to deflect fire
(5) Airmanship (look out)

Exercise 24: Restarting the engine in flight

Note: a learner while flying solo must not practice this exercise. It must be within easy glide to the training field, to be treated as a simulated emergency until engine is successfully restarted.

Aim: To teach the student in-flight procedure for shutting down the engine and restarting the engine in flight for soaring purposes or in the case of engine failure.

Most two-stroke engines will at some time or another stop whilst in flight. It is important that the learner does not panic but is prepared mentally for and able to cope with the situation.

(1) Engine shutdown checks
(2) Engine restart procedures for either a controlled shut-down or engine failure
(3) Airmanship (look -out)

Exercise 25: Unusual and dangerous attitudes / conditions

Aim: To recognize potentially dangerous conditions of flight and to recover safely from unusual attitudes or dangerous flight conditions.

Note: this exercise must not be practiced by a learner while flying solo.

(1) Recognition and correct use of controls, and to affect recovery from inadvertent mishandling of controls
(a) At high speeds
(b) In stall or incipient spin recovery in various configurations
(c) From a spiral dive.
(d) In a steep turn
(e) Following hitting wake turbulence in a 360_o steep turn at 45_o to 60_o bank angles
(f) Flutter
(g) Loss of authority of one or more of the control surfaces

Exercise 26: Loose Formation / Group flying

Aim: to safely fly in loose formation with other aircraft and know safe landing and taking off procedures
(1) Positioning in front, behind or alongside other aircraft
(2) Taking off and landing considerations
(3) Turning
(4) Wake turbulence
(5) Awareness of other aircraft
(6) Blind spots
(7) Maneuvers in front of other aircraft and the effect on them
(8) Radio work
(9) Air Law

Exercise 27: Navigation

Aim: To fly accurately and safely in VMC under VFR a predetermined route CAR 62.17.2 (1) (a) and (b), without infringing the rules governing regulated airspace.

A: Basic Navigation

(1) Flight planning

(a) Weather forecast
(b) Map selection and preparation
(i) Choice of route
(ii) Controlled airspace
(iii) Danger, prohibited and restricted areas
(iv) Safety altitudes
(c) Calculations
(i) Magnetic heading(s) and time(s) *en route*
(ii) Fuel consumption
(iii) Mass
(iv) Mass and performance
(d) Flight information
(i) NOTAMS etc.
(ii) Radio frequencies
(iii) Selection of alternate aerodromes
(e) Aeroplane documentation
(f) Notification of the flight
(i) Pre-flight administrative procedures
(ii) Flight plan form

(2) Departure

(a) Organisation of cockpit workload
(b) Departure procedures
(i) Altimeter settings
(ii) ATC liaison in controlled / regulated airspace
(iii) Setting-heading procedure
(iv) Noting of ETAs
(c) Maintenance of altitude and heading
(d) Revisions of ETA and heading
(e) Log keeping
(f) Use of radio
(g) Use of navaids (if applicable)
(h) Minimum weather conditions for continuation of flight
(i) In-flight decisions
(j) Transiting controlled / regulated airspace
(k) Uncertainty-of-position procedure
(l) Lost procedure

(3) Arrival

(a) Aerodrome joining procedure
(i) ATC liaison in controlled / regulated airspace
(ii) Altimeter setting
(iii) Entering the traffic pattern
(iv) Circuit procedures
(v) Special Procedures for gliding airfields
(b) Parking
(c) Security of motor glider
(d) Refueling
(e) Closing of flight plan, if applicable
(f) Post-flight administrative procedures

(4) Airmanship (look out)

B: Navigation at low heights and in reduced visibility

Note: This is not to be accepted as standard cross-country technique. The student should know to avoid situations where it may be encountered.

(1) Actions prior to descending
(2) Hazards (e.g. obstacles, other aircraft)
(3) Difficulties of map reading
(4) Effects of wind and turbulence
(5) Avoidance of noise-sensitive areas
(6) Joining the circuit
(7) Bad-weather circuit and landing
(8) Airmanship

C: Use of GPS

(4) Entering way-points
(5) Reading GPS information
(6) Following GPS routes
(7) Practical limitations

(8) Airmanship (look out)

Note: Exercise 28 and 29 do not need to reflect practical flying. These exercises merely need to be endorsed in the student/ pilot's logbook by the instructor. This endorsement can be done by any grade instructor.

Exercise 28: Pre-flight inspections

Aim: To promote in the student the habit of systematic, thorough and regular pre-flight inspections. Further detail is available from the General Airworthiness Inspection report and Touring Glider motor installation report guidelines.

Starting in the cockpit and moving clockwise around the airframe the key items to be inspected are as follows:

Specifically the airframe structure and motor type and installation are considered

(1) Fuselage

a. Cockpit - Seating, straps and stowing of loose objects

Fight controls freedom of movement and free play
Flight instruments and radio check, microphone and head sets
Motor management controls operation
Motor management instruments
Placarding
Air venting systems, direct vision panel and vents
Canopy vision cleanliness, yaw string, hinges and latches

b. Internal controls, cables and lines able to be inspected

c. Instrument console, including power supply to instruments, intercom, radio and aerial connections

d. Symmetry

e. Structure

-Wings, ailerons, flaps, airbrakes, hinge points and drive point attachments full and free movement

-Rear fuselage external and empennage including rudder and elevator hinge points and drive point attachments, trim tab free play as well as tailplane to fuselage attachments

-.Front and centre fuselage, wing to fuselage attachments main pin secure and locked.

- No fore and aft wing tip free play. All controls (ailerons flaps and airbrakes connected and safety pins installed

-. General wing beat and stiffness check of airframe

f. Pitots, TE tubes, static's and vents

g. Suspension, undercarriage, spats, skid plate and tow hook assemblies

h. Steering, tail wheel, steering,

i. Sail / skin

j. cables

k. tubing

l. brackets

m. Motor installation, motor mount and mountings.

n. Cowlings, cowl flaps and fasteners, proximity to internals

o. wheels, tyres and pressure

p. brakes and steering system

q. seats and seatbelts

r. fuel-tank, cap, venting, level, contamination, water, grade and quality of fuel

s. battery

(2) Engine, exhaust and gearbox

a. Oil leaks, oil, coolers, lines, sump, level, grade and quality

b. Spark plug caps

c. Cables and electrical wiring & battery

d. Carb rubbers

e. Fan belt / Radiator & fluid level / Cooling system/ Fins

f. Exhaust blow-by, exhaust system and leakage inspection

g. Exhaust springs

h. Air filters & intake system
i. Carburetors
j. Propeller, spinner, installation and pitch changing system
k. Motor block and gearbox inspection
l. Throttle, choke, carburetor heat and all other linkages
m. Firewall inspection, leakage, cable, lines and linkages
n. Primary and auxiliary drive belts.

(3) Systems
a. Fuel system, pumps and lines
b. Electrical system
i. Ignition system

(4). Daily inspection and snag log entries
Service and logbook entries and records

Exercise 29: Passengers

(1) Embarking, disembarking, briefing
(2) Security
(3) Comfort
(4) Mass & balance

Exercise 30: Normal shutdown and restart of engine in flight

(1) Shutting down engine.
a. Sufficient height for a restart.
b. Procedure for failed engine restart.
c. Cooling down of engine and safe shutdown procedures.
d. Operation of vent systems and Cowl Flap.
e. Engine shutdown procedures

(2) Restart of engine in flight.
a. Decision height for engine start or out landing.
b. Preparation for start and cold start checks unfeathering.
c. Warm Start and Cold start using Starter.
d. Start using starter and assisted airflow.
e. Dive start using airflow and unfeathering technique.
(3) Airmanship

Exercise 31: Gliding Engine Off and On (Only to be done if a Gliding rating is sought, and to be done by an approved Gliding club or School.)

Aim: To fly cross country with limited or no engine using only the energy of the surrounding air to sustain flight, student will be required to demonstrate sustained flight demonstrating altitude maintenance or gain to the satisfaction of a suitably qualified Gliding Rated instructor. These maneuvers will not be practiced solo within the first 5 hours of solo.

(1) Awareness of airspace and vertical and lateral limits.
(2) Gliding engine on
a. Identification of lift
b. Observation of other traffic that may be using the same lift
c. Entering and maintaining lift
d. Right of way rules and vigilant and constant lookout.
d. Operation of Flap systems if any.
e. Best thermalling speeds.
f. Awareness of stall in a thermal and early detection
g. Exit from thermal.

(2) Gliding engine off
a. Identification of sufficient lift

b. Observation of other traffic that may be using the same lift

c. Entering and maintaining core of the lift

d. Right of way rules and vigilant and constant lookout.
d. Operation of Flap systems if any.
e. Best climb and thermalling speeds.
f. Awareness of stall/spin in a thermal and early detection
g.. thermal. etiquette
h. Appropriate best speeds for soaring flight
i. Identification of potential lift triggers.

(3) Sustained gliding and high altitude flight.
a. Operation of supplementary oxygen system.
b. Awareness of surrounding airspace and limits.
c. Knowledge of symptoms of Hypoxia.
d. Awareness and use of Hydration systems.

(4) Mountain or ridge soaring.
a. Traffic Observation and ridge rules.
b. Awareness of lee side rotor and turbulence.
c. Awareness of proximity to high ground and avoidance of changing terrain.
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