

ABF Pilot Training Manual

Part 10

Flight Training Exercises (FLT EXS)

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IMPORTANT

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This section details the exercises listed in Part 3 (Syllabus) of this manual.

As each exercise is completed to the competent standard listed here, the Instructor should enter it in the Student Training Record. The student will need to demonstrate a similar minimum standard to the Examiner when undertaking dual and solo flight tests for the issue of the Private Pilot Certificate.

1. PRELIMINARY

(a) Familiarisation with balloon equipment, controls and terminology.

Competent standard

- Give the correct name and functions of parts of a balloon and its associated equipment.
- In the balloon logbook, identify the latest periodic inspection and confirm there is nothing in that inspection, or noted since, to preclude flight
- In the Flight Manual, identify flight limitations and specific control instructions for the balloon.

Instructor

Read through the flight limitations with the student. Point out and explain any unfamiliar parts or systems of the balloon (deflation system, burner system, fuel configuration, location and operation of controls and instruments).

Student

Operate and 'get the feel of' all control lines and burner functions before take-off. Refer to Balloon Components in the A&A section of this manual.

(b) Farmer/landowner relations (see Code of Conduct).

Competent standard

- Show awareness of, and comply with, the ABF Code of Conduct both in flight and on the ground
- Brief the balloon crew adequately about their duties in relation to the Code of Conduct, and check they comply with them.
- Show a positive attitude to public relations in all aspects of balloon operations
- Effectively deal with any farmer/landowner problem which does occur.

Good landowner relations are vital to continued enjoyment of our sport. The pilot is also responsible for the actions of the crew. If a landowner problem is suspected, the instructor and student together should check this promptly after the flight. Refer to the Code section of this manual.

(c) Familiarisation with refuelling techniques, procedures and safety measures.

Competencies:

- Recall and understand refuelling procedures and safety requirements
- Adequately brief a crew person to assist with refuelling
- Demonstrate safe refuelling of a balloon using the procedures and safety requirements.

Instructor

Emphasise the need for protective clothing, adequate ventilation and removal of possible ignition sources whenever propane is handled.

Refer to LPG Properties and Refuelling in the A&A section of this manual.

2. PRE-FLIGHT

(a) Obtaining meteorological forecast and appreciation of conditions.

Competent standard

- Obtain public and aviation forecasts
- Show understanding of the forecast information and its suitability for balloon flight
- Observe weather signs in the proposed flight area and compare these with the forecast information
- If available, use a pibal to observe low level wind speeds and directions
- Obtain first or last light as applicable, and identify local factors which may affect it.
- Apply all the above information to make appropriate and safe flight decisions.

Instructor

Include this exercise in every flight, even if very briefly at first. Once the student understands the basics, ask him to give his assessment of weather and related flight decisions, and then critique his assessment. Compare the forecast with actual observed conditions. Check student is aware of the time of issue and validity of any forecast.

If a student is nervous about starting a flight in given conditions, it may be appropriate to suggest a demonstration flight including for example a windy take-off and/or landing.

Student

Refer to the MET section of this manual. Familiarise with weather basics (and pass the MET exam) as early as possible. Learn to get forecasts independently of the Instructor.

(b) Appreciation of downwind airspace, terrain and power line systems.

Competent standard

- Check NOTAM for the flying area
- Obtain details of any local aerodrome/s in ERSAs and DAP
- Have an appropriate topographic map and aviation chart available covering the proposed flight area, (essential chart details may instead be marked on the map)
- Understand the details of any local SZ's and show they are marked on the flying map
- Identify appropriate items within sight of the launch field, and on the flying map and chart (e.g. powerlines, livestock, physical features, SZ's, airspace boundaries, populous areas, suitable landing areas)
- Plan and conduct the flight safely and legally in relation to these items.

Instructor and Student

Plan each flight together on the topo map, estimating likely distance and direction of flight for the weather conditions and fuel. This is a key part of flight training and should not be glossed over. Refer to Charts and Maps in the NAV section of this manual.

(c) Passenger and crew briefings.

Competent standard

- Brief passengers before take-off on safety procedures while in flight and landing (may be included as part of pre-take-off checks). Briefing must be audible and clear and include all minimum briefing points (refer Checklists in the A&A section of this manual).
- Brief crew on their tasks and related safety procedures to handle crown line, balloon mouth, inflation fan and balloon retrieval. Briefing must be audible and clear and include all minimum briefing points (refer Checklists in the A&A section of this manual).
- Ensure the briefing instructions are followed correctly.

Student

Brief crew for every training flight as if they are handling a balloon for the first time, so that the details are remembered and become a routine. Carry out briefings before starting the fan. Demonstrate what you want them to do, and make sure they have understood.

(d) Choice of suitable launch site.

Competent standard

- Assess potential launch site for suitable surface, upwind shelter, and obstacles. Power lines, houses and livestock immediately downwind should be avoided.
- Confirm landowner permission to use the launch site.

Student

Be aware that dirt, sand or grass may be blown into the envelope by the fan, and then catch alight or fall into people's eyes once the balloon is upright. Surface should be fire safe and suitable for a vehicle (avoid cricket pitches!). Do not assume permission for local ovals or similar areas.

(e) Rigging the balloon for flight, and pre-flight inspection.

Competent standard

- Identify suitable (downwind) direction to lay out the balloon
- Connect balloon components correctly and securely in accordance with the Flight Manual – wires not twisted, karabiners closed
- Check fuel cylinder contents using bleed screw, and ensure no leaks in fuel system

- Ensure deflation line and launch rope are attached before cold inflation commences.
- If assisted by crew, check their work.

Instructor

Explain importance of correct inflation cylinder orientation, so student understands the effect on vapour and liquid feed if orientation is not correct. Show how to 'build a basket' with all equipment on board, checked and secure. With basket upright check fuel contents (open bleed screw to confirm liquid level), check for leaks, test all burner functions, set instruments and radios, put maps and other essential equipment on board. After attaching the envelope, check karabiners are 'down and locked', deflation line attached to the basket, launch rope is short (about 5 metres) and not slack. Pre-take-off checklist items should preferably be completed before cold inflation begins. Refer to the Flight Manual, and Checklists and Briefings in the A&A section of this manual.

(f) Inflation.

Competent standard

- Ensure the public stay at a safe distance from basket, fan and ropes unless they have been briefed to assist.
- Ensure safe operation of the inflation fan
- Cold inflate the envelope in a safe and controlled manner.
- Notify all crew before starting hot inflation. Give correct, audible and precise instructions to crew throughout.
- Operate the burner and hot inflate the envelope in a safe and controlled manner.
- A pilot must remain in the basket at all times while the balloon is hot inflated.

Student

Do each crew job at times to know what is involved. Only proceed with each stage of inflation if safe.

Remember a balloon is most unstable until fully inflated. It is not necessary to spread the fabric by hand before starting the fan. Once the balloon is about half-full of cold air, it is good practice to walk inside it; check all control lines (running them through your hand), pulleys and fixings, check the vent/deflation system is correctly fitted, and inspect the envelope.

Warn the mouth crew before starting the burner. Wait till the envelope is well filled by the fan, as a well filled balloon requires less effort by the crown crew as it rises.

Add a few bursts of heat if necessary until it is completely rounded, then switch off the fan and continue heating until the balloon stands up. If wind disturbs the burner flame during hot inflation, pause until conditions are calm enough to continue.

Start hot inflation with one leg stretched backwards into the basket, and as the balloon rises bring the other leg into the basket as well – it is not acceptable to sit on the basket edge as it rises with both legs dangling outside. As soon as the basket is buoyant, get the crew to move it forward until the launch rope is tight again, then pull the vent line (to check its operation and reduce buoyancy). Refer to Inflation Fans in the A&A section of this manual.

(g) Pre-take-off checks.

Competent standard

- Check condition and operation of critical equipment before flight
- Passenger briefing must be completed before take-off (see 2c above)
- Checklists and briefings must be audible, clear and include all minimum checklist points (refer Checklists in the A&A section of this manual).
- Assess ability to clear downwind obstacles in relation to wind and possible false lift
- Make safe decision to take off or abort flight consistent with current experience and ability.

Instructor

Most pre-take-off checks should be simply a re-check of items that have already been completed. The process should therefore be quite quick. Allow the student to use a previously established checklist, provided it is adequate. Encourage him to use a written list if he has not memorised it.

Review the balloon with the student before take-off, eg “This is a fairly porous 84,000 cu ft balloon with parachute rip and no rotation vents. It has a double burner with two liquid feed pilot lights, one quiet burner and no crossflow.”

(h) Use of launch rope, also hands on/hands off the basket exercise.

Competent standard

- Ensure the balloon is attached with an adequate launch rope to a vehicle or other solid object from before cold inflation until immediately before take-off.
- Ensure fixings are suitable and the rope can be released easily and safely by the pilot from the basket (a quick release mechanism is preferred but not essential).
- Instruct the crew to hold the basket edge, using clear ‘Hands on’ and ‘Hands off’ instructions.
- Once pre-take-off checks are completed, and the balloon is buoyant enough to clear obstacles, release the rope in a safe and controlled manner.

An adequate launch rope should be strong enough to restrain the balloon. It should be fixed as required in the Flight Manual – or if not specified in the manual, to a corner of the burner frame (or two corners using a vee-bridle), or around one or two sets of basket wires at basket top height.

Instructor

Emphasise minimum crew to have hands on – to avoid too much weight. Their feet must remain firmly on the ground at all times, and hands rather than elbows on the basket edge. They should stay clear of the downwind side in case the basket drags. ‘Hands on’ means hold the basket down firmly. ‘Hands off’ means raise hands to see if the basket is buoyant. Build up enough lift to clear obstacles and counteract any false lift. Warn crew to stand clear when releasing the rope in case it rebounds. Refer to False Lift and also Launch Rope and Quick Release in the A&A section of this manual.

3. FLIGHT OPERATIONS (NORMAL CONDITIONS)

(a) Take-off. Slow climb out in light wind condition.

Competent standard

- Take off without undue delay in a safe and controlled manner
- Be aware of the balloon's movement in relation to nearby obstacles, and maintain adequate clearance from them.
- Be aware of, and take action to counteract, any potential false lift.
- Level out the balloon at an appropriate height

Instructor

A climb rate of around 200 ft/min is suitable. Student should be aware of livestock and power lines downwind. Demonstrate the delayed response to the burner. A 'touch and go' soon after take-off can be helpful, to demonstrate that slow approaches and landings are not to be feared.

Refer False Lift and Clearing Obstacles in the A&A section of this manual.

(b) Level flight - effect of burner.

Competent standard

- Climb to a requested altitude which is at least 300ft AGL
- Maintain level flight for 2 minutes within ± 100 ft of that altitude.

Instructor

The student needs to be able to recognise the balloon movement fairly accurately before he can develop any real sense of when – and how much – to burn or vent in order to achieve a desired result. Explain that it helps to look at the horizon and to look from side to side to judge vertical movement. In light wind or at height, the horizontal movement (direction of flight) is easier to judge by watching the movement of the ground relative to the bottom edge of the basket.

Level the balloon out at say 300-500 ft AGL and demonstrate the effects of different duration and frequency of burn. If a large, open paddock, free of livestock and power lines is available, practice the exercise closer to the ground, say 20 ft AGL. It is easier to learn to judge the movement and to achieve fine control at low level, and it will not matter if there are a few unintentional ground contacts.

(c) Climb and descent, effect of burner and vent.

Competent standard

- Recall the maximum rates of climb and descent, the maximum envelope temperature for the balloon being flown, and any limitations on use of the vent. Comply with these during the exercise.
- Use the burner to increase rate of climb or reduce rate of descent
- Use the vent to increase rate of descent or reduce rate of climb
- Achieve and maintain a requested rate of climb or descent (within about 20%)
- Carry out this exercise in a safe and controlled manner.

Instructor

Demonstrate a faster than normal climb out and then slow the climb by using the vent. Show how easy it is when climbing to arrest the climb or commence a descent. Demonstrate how to maintain a prolonged climb for say 1,500-2,000 ft. After a period of level flight at altitude, initiate a descent - first by letting the balloon cool, then another time by using the vent, to observe the difference. Demonstrate how to slow or arrest a descent by use of the burner. Demonstrate use of double burner (if available) for quicker response, being careful not to overburn.

(d) Approach and overshoot from low level, awareness of powerlines.**Competent standard**

- Select a suitable intended landing field, and explain the choice.
- Perform minimum pre-landing checks (see A&A notes – Checklists)
- Identify powerlines and other obstacles and maintain safe clearance throughout
- Make a controlled landing approach without undue delay
- When requested to overshoot, level out without making ground contact and climb promptly in a safe and controlled manner.

Instructor

Refer to Emergencies in the A&A section of this manual for powerline recognition. Maintain powerline watch whenever descending to or flying at low level. Get the student to control descent rate and approach angle first, the precise landing point comes later. Initially practice this exercise in slow wind conditions. If wind above is faster than on the surface, explain that a low level approach will reduce the balloon speed and make a landing safer and easier. Set up a straight and level approach at about 100 ft AGL. Check that the back up burner system is working and that you have a reserve of fuel. Explain the exercise is to make a landing approach, then avoid ground contact and climb away when requested. Make an approach as if intending to land, then at some point burn out to initiate a climb. If conditions allow, repeat the exercise several times. This exercise is very helpful in demonstrating the inertia of the balloon, both horizontally and vertically. It also demonstrates how much re-heating of the balloon is required after a descent, to clear objects in the overshoot area. Try to avoid overburning when clearing obstacles, so that another landing can be attempted soon after the overshoot.

ARE YOU UP TO DATE?

*New regulations and procedures may apply from time to time.
Check on the ABF website that you have the latest version of these study notes.*

(e) Intermediate landing using vent.

Competent standard

- Choose suitable landing field, and explain choice
- Pre-landing checks should be carried out well before landing to ensure safety.
- Identify powerlines and other obstacles and maintain safe clearance throughout
- Pilot lights and burner must be off before ground contact and may be relit once the balloon is stationary and upright.
- Achieve a safe and controlled landing to a complete stop in a suitable area, keeping the balloon inflated. (Or, if ground wind does not allow a complete stop, make controlled ground contact and continue flying.)
- Control the balloon during final approach to give a low vertical speed on touchdown.

Instructor

Approach procedure should be as for overshoot above. However this time full pre-landing checks must be done. Have plenty of room as unintentionally hard landings may be experienced initially. Be aware of students fear of "ground rush" and tendency to overburn. Before ground contact check all on board are holding on appropriately (instructor and student included!), and loose gear stowed. Explain not to burn during ground contact as burner control may be inadequate. After contact check direction of burner before burning again. Use the vent just enough to make the basket 'stick' with minimal deflation. If a full stop is not possible explain a 'pendulum' swing is normal after contact and can be disorienting. Refer to Checklists and Landings in the A&A section of this manual.

(f) Final landing using rip panel.

Competent standard

- As for intermediate landing, followed by complete deflation of the envelope.
- Deflation may occur some time after landing if wind conditions allow.
- Deflation must be safe and controlled, avoiding obstacles and without the envelope deflating onto the burner.
- Advise passengers when it is safe to leave the basket.
- Soon after landing turn off all gas, vent gas lines, and turn off instruments.
- Ensure that balloon retrieve crew follow the Code of Conduct.

Instructor

Use methods employed in (c) (d) and (e) above. If the balloon has a Smart Vent or velcro rip for example, this may be used for full deflation. The appropriate line should be decided in advance and ready to hand. Maintain hold on rip line till balloon is well deflated. Before anyone leaves the basket the balloon should have lost enough buoyancy to ensure it remains grounded and the basket will not drag further.

In light wind an intermediate landing should be completed, and the basket well grounded: a passenger may then be allowed to leave the basket to pull the crown line firmly away to ensure the envelope does not contact the burner during deflation.

Once there is no danger of further movement, other passengers and the pilot may leave the basket progressively and assist with squeezing the air from the envelope.

Crew may enter the landing area on foot to assist, but should not drive in until an effort has been made to get permission (except in an emergency).

(g) Flight to 4,000 feet AGL.

Competent standard

- Carry out appropriate flight planning for the
- Maintain positive climb rate to a required altitude which is at least 4000ft AGL, followed by level flight at that altitude.

Instructor

This exercise is intended to build confidence in climbing quickly and steadily, and flying at altitude. Consider warm clothing if extended flight at altitude is planned, as temperature may be 8–10 degrees cooler. Ask the student to report aloud any changes observed during the climb, such as wind speed and direction, visibility and balloon performance. Fast climb rate causes airflow down the envelope; this should not be confused with horizontal wind shear, which may also be present at times. Note that vertical movement at altitude is generally easier to judge by instruments than by eye.

Flight planning is essential and should include:

- load chart (load calculation for the given conditions and expected ceiling, allowing for a possible upper inversion)
- maps and charts (expected track for the forecast upper winds, consideration of airspace, obtain airways clearance if required, downwind obstacles and suitability of projected landing areas)
- suitable weather conditions for the estimated flight duration
- fuel availability including safe fuel reserve for the estimated flight duration, and
- carrying a VHF radio if flight will exceed 5,000ft AGL.

(h) Experience terminal velocity descent.

Competent standard

- Climb to at least 3000ft AGL and level out
- Without venting, allow descent rate to increase. Do not exceed the permitted maximum rate of descent
- Use burner if necessary to maintain control or keep the balloon safely inflated
- Regain level flight at or above a selected safe height.

This exercise is often done straight after the previous one. It is intended to build confidence in making a controlled fast descent. It also shows what to expect should a burner fail at altitude, and what vertical distance is needed for recovery. It is important for the instructor to be confident and to put the student at ease. Note that ‘terminal velocity’ is simply another name for the natural maximum descent rate (sometimes called ‘cold descent’).

Instructor

Refer to Cold Descent in the A&A section of this manual.

Before descending check burners are working well, adequate fuel is available, and the pilot light pressure is enough to resist a moderate wind. Check the intended descent area is suitable, eg with respect to built up areas and SZ's. Ask the student to observe and report what happens as the balloon descends, including changes in the descent rate. Similar changes are likely during descent as were noted during the climb. Be aware surface wind conditions may have changed. Heat should be maintained if the mouth starts to narrow noticeably, though this is uncommon. Vertical airflow past the balloon while descending may be more noticeable than when climbing, and ears may 'pop'. The balloon may start to 'corkscrew' (rotate and swing around its vertical axis).

Always arrest the descent with a good safety margin in hand (say 500ft). A useful rule of thumb is to halve the descent rate, and allow that vertical distance in feet for the levelling out process, eg allow 400ft to level out from 800fpm descent. In practice this is typically achieved with one long burn (10 secs or so) followed by a short pause to observe the effect of this, and then one more measured burn. A 5 second double burn initially is even more effective. Note the altitude when starting the first burn, then again at 400fpm and then again when level – the response is usually noticeably quick and reassuring.

(i) Tethered flight – appreciation of hazards and precautions.**Competent standard**

- Attach tether ropes, arrange anchor points and basket position to allow for a safe tether
- Assess suitability of weather conditions for proceeding with inflation
- Inflate the balloon, ascend and descend on tether ropes several times, and deflate in a safe and controlled manner
- Recall and understand the public safety requirements for tethered operations.

Instructor

Refer to the Flight Manual, and to Tethering in the A&A section of this manual. A competent standard in this exercise is required, however 1 only hour of tethered time may be logged in the total 15 hours required for Certificate issue. This exercise may be usefully done early in training – perhaps on a foggy morning – to familiarise with the basket and controls, practise landings, and experience the momentum of the balloon, delayed reaction times, false lift, and variations in loading.

(j) Appreciation of the effect of variations in loading on balloon operations.

Competent standard

- Maintain adequate control of a balloon following a significant change in the load being carried

Instructor

It is recommended to vary the loading in a free flight situation so the student gains experience with rates of climb and descent over a larger range of altitudes. Add or remove a person on board, or add fuel cylinders. Do not remove full cylinders as conditions may change, and a 'have to land' situation with exhausted fuel supplies is not desirable. It is preferable to achieve this exercise before doing a first solo. Refer to the ABF Ops Manual regarding carrying passengers on training flights.

(k) First solo flight.

Competent standard

- Take off, fly and land in a safe and controlled manner without another person on board.
- Perform requested exercises during solo flight (eg, baulked approaches, intermediate landing, fast climb out, low level flight) on this or subsequent solo flights observed by the instructor.
- A minimum of 10 minutes flight is suggested.
- Display an appropriate level of command ability throughout this exercise.

Instructor

Pick a good day, say at the end of a dual training session. Make sure the student is not getting tired but has good awareness and control. Choose conditions in which the student has flown before and which are likely to remain stable beyond the anticipated duration of the flight. Check the student has passed the required ABF theory exams and is proficient on all emergency procedures and aware of the balloon's flight limitations, airspace limits and local SZs. Ensure adequate fuel supplies. Set a few minor tasks, not necessarily on the first solo. The territory to be overflown should be reasonably accessible from the ground, so the instructor is able (as required) to observe the solo flight. Check radio communication before the solo flight begins.

If the Student is unwilling to do the flight, continue with dual training and pick another day to go solo.

YOUR FEEDBACK PLEASE!

If you have any corrections or suggested improvements to these study notes please advise the ABF Operations Manager.

4. IN-FLIGHT PROCEDURES

Instructor

As a guide, in-flight procedures should be carried out **about every 10 minutes**. Introduce them early in training. Be prepared to take the controls while the student becomes familiar with an exercise. Once the student can do the exercise, get him to incorporate it while he is continuing to control the balloon. Only then can he be considered to have achieved a competent standard.

Maintaining communications with ATC, other aircraft and crew (as necessary) is not a required exercise, but it is helpful to include it.

(a) Use of maps and instruments. Appreciation of position and movement of balloon.

Competent standard

- Orient the flying map and chart, and at all times be able to indicate on each the current position and projected flight path of the balloon. (Chart need not be used provided relevant information from the chart is provided on the map.)
- Recognise on both map and chart any features which are relevant to the flight and any landmarks which are visible during flight. (Chart need not be used provided relevant information from the chart is provided on the map.)
- Estimate wind speed and direction since take-off or last fix, and indicate with reasonable accuracy the projected position of the balloon in a given time (say 40 minutes ahead)
- Recognise relevant airspace boundaries and remain within permitted airspace at all times.
- Understand the function of required instruments (altimeter, variometer, ambient temperature gauge)
- Set the instruments, confirm they are operating, and take readings from them
- Identify the horizontal and vertical movement of the balloon without instruments, accurately enough to maintain safe and controlled flight.
- Maintain adequate control of the balloon during this exercise.

Instructor

Visual recognition of the balloon's movement is the basis of all control. Until the student can see how the balloon movement is changing, he cannot recognise when control inputs are required or recognise the result of the inputs. This judgement is easier to learn in low level flight, and is gradually extended to higher levels. Encourage the student to look at the horizon and look around to increase visual clues. Horizontal speed and direction is easier to judge at higher levels by watching the ground move relative to the bottom edge of the basket. Cover the instruments at times so the student gets confidence in his own judgement. Instruments should be used to confirm and assist visual recognition, not as a sole guide. There is a slight time lag in instrument response; human judgement is often sharper. Check the student can set altimeter to QNH and is thoroughly familiar with maps and charts. A good practice is to plot your position and track on the map with a pencil every 10 minutes or so.

(b) Fuel management.

Competent standard

- Maintain awareness of which burner and cylinder are in use and the remaining fuel available.
- Arrange fuel use so that a second cylinder (and burner if present) is ready to use at all times.
- Establish a safe fixed fuel reserve and land with this intact
- Change the fuel cylinder in use safely and promptly. Fuel lines must be emptied before being disconnected.
- Maintain adequate control of the balloon during this exercise.

Instructor

Ensure student is familiar with the burner and cylinder controls, recognises fuel contents and fuel pressure, and can estimate remaining fuel and flight duration, so that landing is achieved with a fixed fuel reserve intact (20 litres is suitable). If it may become necessary to use some of this reserve, warn the crew and take any other appropriate action to ensure a safe landing with some fuel still available. The student should recognise that the last 5% or so in a cylinder is at much lower pressure, so burner response is much less effective. When changing fuel cylinders, have the balloon well clear of obstacles, preferably climbing slightly, and check that the burner is operating on another cylinder, so that control can be maintained during the changeover.

(c) Considerations when operating in company with other balloons.

Competent standard

- Maintain awareness of any nearby balloons and safe clearance from them
- Know and apply relevant right of way rules
- The basket of the balloon being flown must not contact the envelope of another balloon
- Maintain adequate control of the balloon during this exercise.

Instructor

This exercise may be simulated if there is no opportunity to fly with other balloons. The student should know the right of way rules. Get him to use all available resources to check the position and movement of balloons which are out of sight overhead (eg radio to another balloon or ground crew who can see better) and to warn another balloon when his balloon is out of sight above it (eg shout, whistle, hooter). Control inputs should generally be more conservative when near to other balloons. He should also be aware of other kinds of nearby aircraft and how to fly appropriately.

(d) Observation of weather developments.

Competent standard

- Maintain awareness of weather conditions during flight and report any significant developments
- Particular attention should be paid to surface conditions which may affect landing, and to development of potentially adverse weather
- Maintain adequate control of the balloon during this exercise.

Student

Always be aware of the prevailing conditions. While flying, look upwind from time to time to see what is developing. Watch for change in cloud types. Be aware of surface indicators for changes in air speed and direction, eg dust, smoke, waving crops, tree movement. Monitor ambient temperature for inversion conditions and possible wind shear. Be aware that increase in surface temperature may lead to convective currents and thermals.

Instructor

If a student becomes nervous of weather conditions during flight (eg wind speed, mild turbulence), offer more assistance or take the controls to ensure the training experience is not inappropriately stressful.

(e) Detection of power line system.

Competent standard

- At or below 500ft AGL, be able to locate all powerlines within a radius of about 500 metres of the balloon before further descent
- Maintain awareness of all nearby powerlines whenever flying at or below possible powerline height
- Use passenger and crew resources to assist (if available)
- Maintain adequate control of the balloon during this exercise.

Refer to Emergencies in the A&A section of this manual. This exercise should be taught from the very first flight, and reviewed as part of every flight.

YOUR FEEDBACK PLEASE!

If you have any corrections or suggested improvements to these study notes please advise the ABF Operations Manager.

5. EMERGENCIES

These situations are to be simulated where they cannot be put into practice safely. The student pilot should demonstrate his reactions as far as possible, rather than simply talk through what he would do. **To achieve the competent standard, the student must show he can respond to each emergency promptly and confidently.**

Refer to the balloon Flight Manual and to Emergencies in the A&A section of this manual. Note the Flight Manual takes precedence.

(a) Pilot light failure and fuel supply problems.

Competent standard

- Demonstrate appropriate procedures for locating possible causes of pilot light failure and rectifying them where possible
- Demonstrate how to create an emergency pilot light using a main burner, also by using a quiet burner if available
- Demonstrate appropriate procedures for locating possible causes of fuel supply problems, and rectifying them where possible, including relocating fuel hoses or cylinders to ensure fuel supply.

Demonstrate and practise in detail on the ground, by actually turning off pilot lights or valves or disconnecting fuel feed. The student should then be able to demonstrate reactions in theory during flight.

Optional – turn pilot lights out or fuel off while flying. This should not be done without warning the student or without adequate safety precautions including checking a spare ignition source beforehand.

Note: Passengers must not be carried for this exercise. Refer to ABF Ops Manual.

(b) Power lines, use of handling line.

Competent standard

- Carry out appropriate procedures for making a safe and prompt emergency landing when it is not certain that the balloon will safely clear a powerline
- Demonstrate knowledge of safety procedures in the event that a balloon is in contact with a powerline
- Carry out appropriate procedures for using a handling line to move a balloon in a safe and controlled manner.

Using a handling line should be experienced in calm or light wind, before take-off or before the balloon is deflated after landing. Get the student to successfully direct the crew to pull the balloon over a fence or other obstacle (can be simulated in the middle of an open paddock). A handling line should only be used at a safe distance from powerlines. Check it is attached before using it! (usually to an internal rope handle).

(c) Considerations of landing in difficult conditions: trees, water, confined space.

Competent standard

- Demonstrate knowledge of appropriate procedures and considerations for landing in trees, water or confined space.

Optional – settle the basket in the top of a strong tree in calm conditions, or make a gentle ‘splash and dash’ on water surface in light wind,

(d) Emergency landing procedures and briefing for passengers.

Competent standard

- Demonstrate knowledge of emergency landing procedures
- Give an appropriate passenger briefing for an emergency landing
- Initiate a fast descent from altitude as if for an emergency landing, but do not make ground contact.

An acceptable minimum procedure for low level emergency landing (eg powerline emergency) is:

- Avoid powerlines if possible
- Pull the deflation line and brace for landing
- At the same time loudly and clearly warn passengers to ‘GET INTO LANDING POSITION AND HOLD ON’

Other actions including pilot lights out, make gas safe, and advise passengers to ‘KEEP HOLDING ON AND STAY IN THE BASKET’ should follow after landing if there is not time before to do them beforehand.

Note: Passengers must not be carried for this exercise. Refer to ABF Ops Manual

(e) Considerations of fuel leaks and fire in air and on ground.

Competent standard

- Demonstrate knowledge of appropriate procedures in the event of a fuel leak or fire in the air or on the ground

Simulate only! Make sure the student locates the fire extinguisher, takes it in his hand, and knows how to use it.

6. OPTIONAL FLIGHT OPERATIONS (advanced conditions – not mandatory)

Although not required, these exercises can add very useful experience to develop the student's confidence in a wider range of situations. They are particularly helpful if the student has experienced only ideal weather conditions throughout his training, and may therefore tend to be overconfident. They demonstrate how easily a balloon can feel 'out of control' and the need for vigilance to avoid this, as well as the importance of prompt reactions and safe procedures in marginal flight conditions.

Instructor

Only attempt these exercise if you are already experienced and confident of flying in the conditions yourself. Only allow the student to take the controls as appropriate to his skill level. Be especially vigilant to take over control or give assistance if the student wishes or you consider it is necessary for safety.

(a) Take-off, fast climb-out from shelter in moderate wind.

Competent standard

- Take off from shelter in moderate wind in a safe and controlled manner with adequate clearance of nearby obstacles.
- Level out the balloon at an appropriate height
- Maintain awareness of balloon movement and false lift effects during the exercise.

As for normal take-off (exercise 3a), but actually experiencing false lift and fast climb out for adequate clearance, rather than just discussing the possibility of it. Note that substantial false lift can occur even when launching in very calm conditions in the lee of tall trees, if there is wind over the trees.

(b) Fast (or running) take-off in moderate wind, fast climb-out and descent.

Competent standard

- Take off without shelter in a moderate wind in a safe and controlled manner with adequate clearance of nearby obstacles.
- Level out the balloon at an appropriate height
- Maintain awareness of balloon movement and false lift effects during the exercise.

As for the previous exercise, but without the benefit of shelter. The balloon should be well inflated before it stands up, as even a small 'dimple' in the upper side of the fabric can be difficult to fill against the pressure of the wind. If the balloon rocks from side to side on the ground, demonstrate how to reassure passengers and crew, maintain control and an upright position as pilot.

Running take-off should NOT be done (i.e. basket dragging along the ground initially, or lifted by the crew running alongside). This exercise has been superseded by the requirement to use a launch rope. If sufficient buoyancy for safe take-off cannot be achieved while the launch rope is attached, the take-off should be aborted.

(c) Approach and overshoot from high level.

Competent standard

- Initiate descent at about 500ft AGL, build up descent rate, and when close to the ground level out or climb without making ground contact, in a safe and controlled manner

As for low level approach (exercise 3d), but finer control is required to manage the higher descent rate. In lighter wind, the approach angle will be steeper, making it harder to judge descent rate by eye. In this situation it is important to look around and also at the horizon, rather than get fixated on the spot you are flying towards.

(d) Landing at high descent rates.

Competent standard

- Make a safe and controlled landing at about 400ft/min descent rate.

This descent rate will produce a hard bump but should not cause any injury or damage provided adequate pre-landing checks are carried out. Refer to Checklists and Briefings in the A&A section of this manual.

It is advisable to bend knees a little more than for a normal landing, and make sure they will not hit a hard surface as they continue to bend after ground contact. To minimise the basket becoming airborne again after initial contact, pull the deflation line just before contact is made, and keep it well open provided the basket remains near the ground. Refer to Hard Landings in the A&A section of this manual.

Note: Passengers must not be carried for this exercise. Refer to ABF Ops Manual.

(e) Flight in mild thermal conditions.

Competent standard

- Recognise mild thermal conditions from the partial loss of horizontal and/or vertical control of the balloon
- Maintain safe flight with adequate obstacle clearance
- Promptly identify an appropriate landing area and make a prompt and safe landing.

Refer to Thermals in the MET section of this manual. Be aware cumulus clouds indicate the formation of thermals, but thermals may also occur in a clear sky. Do not confuse thermals with mechanical turbulence, which is another thing altogether. Learn to recognise the types of surfaces that promote thermals, eg rock faces or quarries, dark surfaces, lush green crops. Do not assume thermal activity will decrease as the day ends.

(f) Landing in moderate wind

Competent standard

- As for final landing (exercise 3f) but in moderate wind conditions such that the basket lies down and it is not possible to keep the envelope inflated after landing.
- Select a landing area of suitable size and surface, and bring the balloon safely to a stop within this area.

Even if a Smart Vent or similar positive deflation system is used, the basket may drag some distance before stopping. Passenger briefing should emphasise the need to keep the whole body safely within the basket until the pilot advises it has safely stopped. Refer to Fast Landings in the A&A section of this manual.

7. ENDORSEMENTS CAPACITY GREATER THAN 120,000 CU FT (3,400 CU M)

The considerations in this section may also apply to smaller balloons, so they should be thoroughly discussed with the student. When training in a balloon of 120,000 cu ft or less which includes any of the equipment listed below, the instructor should ensure the student demonstrates competence to use that equipment.

The competent standard must be demonstrated in a balloon larger than 120,000 cu ft in order to get endorsement for that size of balloon.

- (a) **Accelerations due to increased mass and momentum.**
- (b) **Deflation systems.**
- (c) **Basket orientation – use of rotation vents, divided basket, and passenger control**
- (d) **Burner – multiple burners, cross flow valves, manifolded and non-manifolded fuel systems.**

Competent standard

- Demonstrate understanding of the effect of increased mass on the momentum of the balloon
- Safely control that size of balloon, including appropriate timing and amount of control inputs, and use of all control features provided
- Demonstrate appropriate passenger control to maintain comfort and safety at all times.
- Understand the safety purpose of basket divisions and the importance of landing with the long side of the basket at right angles to the direction of travel. If the basket is divided, land safely in this manner.

8. NIGHT FLIGHTS

- (a) **Regulatory requirements**
- (b) **Flight planning.**

Refer to the ABF Ops Manual and relevant CASA regulations and procedures.

Competent standard

- Demonstrate knowledge of the regulatory requirements for night flight in a balloon
- Demonstrate adequate flight planning and carry out a night flight in a balloon in a safe and controlled manner under the supervision of a suitably qualified pilot.