12 – CIRCUIT, APPROACH AND LANDING

SPL Syllabus: Exercise Circuit approach and Landing			
(i)	**Procedures for rejoining the circuit**	**(vi)**	**Visualisation of an aiming point (the reference point)**
(ii)	**Collision avoidance, lookout techniques, and procedures**	**(vii)**	**Approach control and use of airbrakes**
(iii)	**Pre-landing checks, circuit procedures, downwind and base leg**	**(viii)**	**Normal and crosswind approach and landing**
(iv)	**Effect of wind and windshear on approach and touchdown speeds**	**(ix)**	**Short landing procedures and techniques**
(v)	**Use of flaps (if applicable)**		

INTRODUCTION

A circuit, approach and landing will be flown on every flight. There are many reasons cited for flying a circuit all of which are valid. In power flying, a circuit ensures an orderly pattern of traffic flying visually around an airfield. This is also true for gliders, however, there are other more fundamental and practical reasons for us doing so.

- It enables us to remain within easy gliding range of our chosen landing area.
- It allows us to remain visual with the chosen landing area.
- Most importantly, it enables us to position the final turn such that we can use the correct approach control technique to achieve a safe landing in the chosen landing area.
  In other words, it allows us to arrive:
  - at the final turn in the right place;
  - at a safe height and speed; and
  - with safe alternatives available.

The chapter is divided into three parts, circuit planning, approach control, and landing. These are distinct exercises for the trainee to master and each should be taught separately.

The exercises completed by the trainee up to this point of the syllabus have been focussed on fundamental flying skills, that is, handling the glider. This is the first exercise where we will be expecting the trainee to exercise judgement, and this will increase their workload significantly. It is important that before commencing this exercise, that they have demonstrated proficiency in:

- Adequate lookout techniques.
- Use of coordinated controls.
- Coordinated turning and rolling out in a nominated direction.
- Achieving and maintaining a straight glide towards a nominated feature.

By the time the trainee comes to this stage of their training, they will have seen their instructors fly many circuits, approaches, and landings, and so in teaching this exercise, you are building on what they have already experienced.

THEORY BRIEFING

CIRCUIT PLANNING

Prior to joining the circuit, the pilot should be building good situational awareness of other traffic using good lookout techniques, utilising FLARM and listening actively on the radio. As soon as you realise you need to land, identify the wind strength and direction (windsock) and choose a suitable landing area. Position yourself upwind of the airfield in such a position that you can turn and roll out on a downwind track as you fly through the high key area. Once committed to the circuit, the pre-landing/circuit checks should be completed prior to starting the circuit – this is to manage the workload and ensure the focus is on the main task of flying the circuit.

The recommended pre-circuit check is **WULF.**

W Water ballast released.

U Undercarriage down

L Loose articles stowed and straps secure.

F Decide appropriate flap setting for approach & landing.

The circuit should be planned back from where we intend to land and stop the glider. Figure 1 shows a normal circuit with a high key area located upwind and to the planned circuit side of the landing area, a low-key area abeam the landing area and reference point.

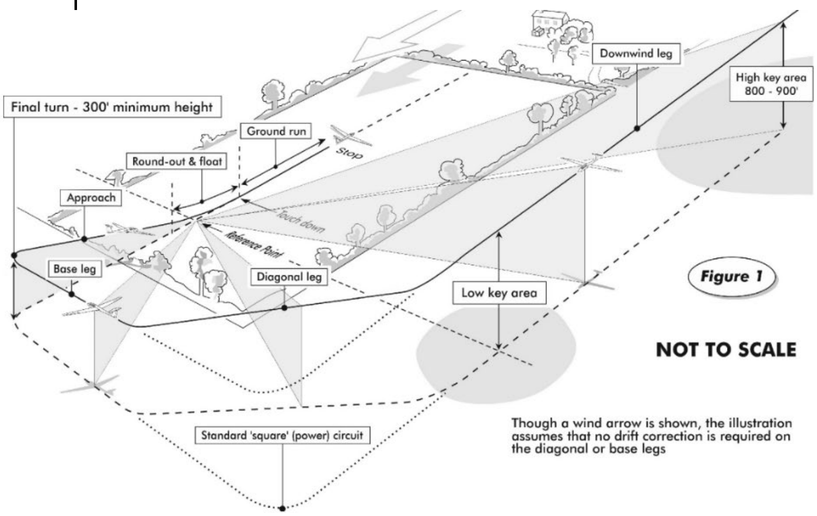


Figure 1

NOT TO SCALE

Though a wind arrow is shown, the illustration assumes that no drift correction is required on the diagonal or base legs

In the high key area the glider should be approximately 700-900 feet and in the low key area around 500-700 feet; note that these are approximations as height should be judged primarily from the visual picture; trainees should be taught to disregard the altimeter once they have started the circuit and to use the angle to the reference point as their primary reference for judging correct position. Most gliders in still air, sink at around 200 feet per minute and their groundspeed once in the circuit is around 60 kts – thus to lose 200ft, high key should be positioned approximately 1nm upwind of the low-key position. This should give adequate time for the pilot to assess their progress and position relative to their chosen landing area and make appropriate corrections; shorter or non-existent downwind legs make this task much harder.

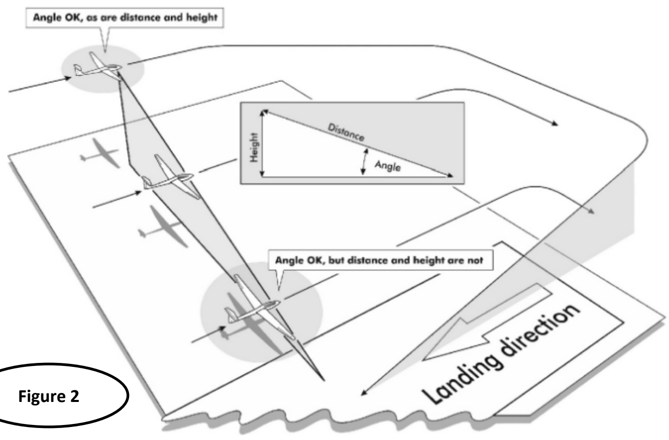


Figure 2

An effective lookout must be maintained throughout the circuit. It is very easy to become fixated on the landing area/reference point and so pilots must be vigilant in ensuring they maintain an appropriate scan outside the circuit and across the airfield to look for traffic on wider or opposing circuits. As they get closer to the natural funnel of the final approach, the risk of collision increases markedly; FLARM at this stage can be ineffective at as it will alarm off stationary gliders/aircraft on the ground close to the approach path.

A sensible speed should be flown for the conditions – for most gliders use best L/D, which, in many cases, will be very close to a normal approach speed; it is recommended to set and re-trim for the nominated approach speed as you approach low key as this will reduce tasks when the workload naturally increases in the latter part of the circuit.

In the early stages of training trainees will take a while to trim, so this process may need to start earlier on downwind leg, or even before high key.

<u>Reference Point (RP)</u>

The reference point is best described as the point on the ground at which on a steady approach, we would hit the ground if we failed to round out. It is selected based on where we want to land and stop the glider and therefore its position is affected by the strength of the wind and the steepness of the approach.

It might be easily defined by a recognisable point on the ground that the pilot can fly directly towards, as an area to the side of a ground feature, or it might just be a less defined area of grass to make the approach to. The more clearly defined, the easier it is to fly an accurate approach towards it.

As the glider progresses downwind, the pilot must continually monitor the chosen landing area to ensure it remains both unobstructed and within gliding range. It is essential that alternative landing options are constantly assessed in case the primary landing area becomes obstructed or other factors such as heavy sink are encountered; this ensures the circuit can be immediately adjusted and a safe approach and landing completed.

Spacing in the circuit is based upon the strength of the wind and the expected steepness of the approach. Ideally, the angle to the reference point should be similar to or just slightly shallower than the intended approach. Care must be taken to ensure that other parameters remain safe. If too high, care must be taken to ensure the circuit is not excessively wide; in this situation the angle would look fine (see Fig 2) but the spacing is not. Conversely, you can be too low, but the angle looks okay; in this case you may be too close, however, the greater issue here is that you may not have sufficient height to execute a safe turn onto the approach.

Awareness of height is important and learning to judge height above the ground without relying on the altimeter is a skill that needs to be taught to trainees. One simple technique is to observe how much fine detail can be seen on ground features. With trees, above around 1000 ft and at close range, very little detail can be seen, whereas once you descend below that height, finer detail will start to appear which becomes more apparent, as you get lower, with individual large branches starting to appear around 500 ft. Similar effects can be seen with other ground features.

<u>Diagonal and Base Legs</u>

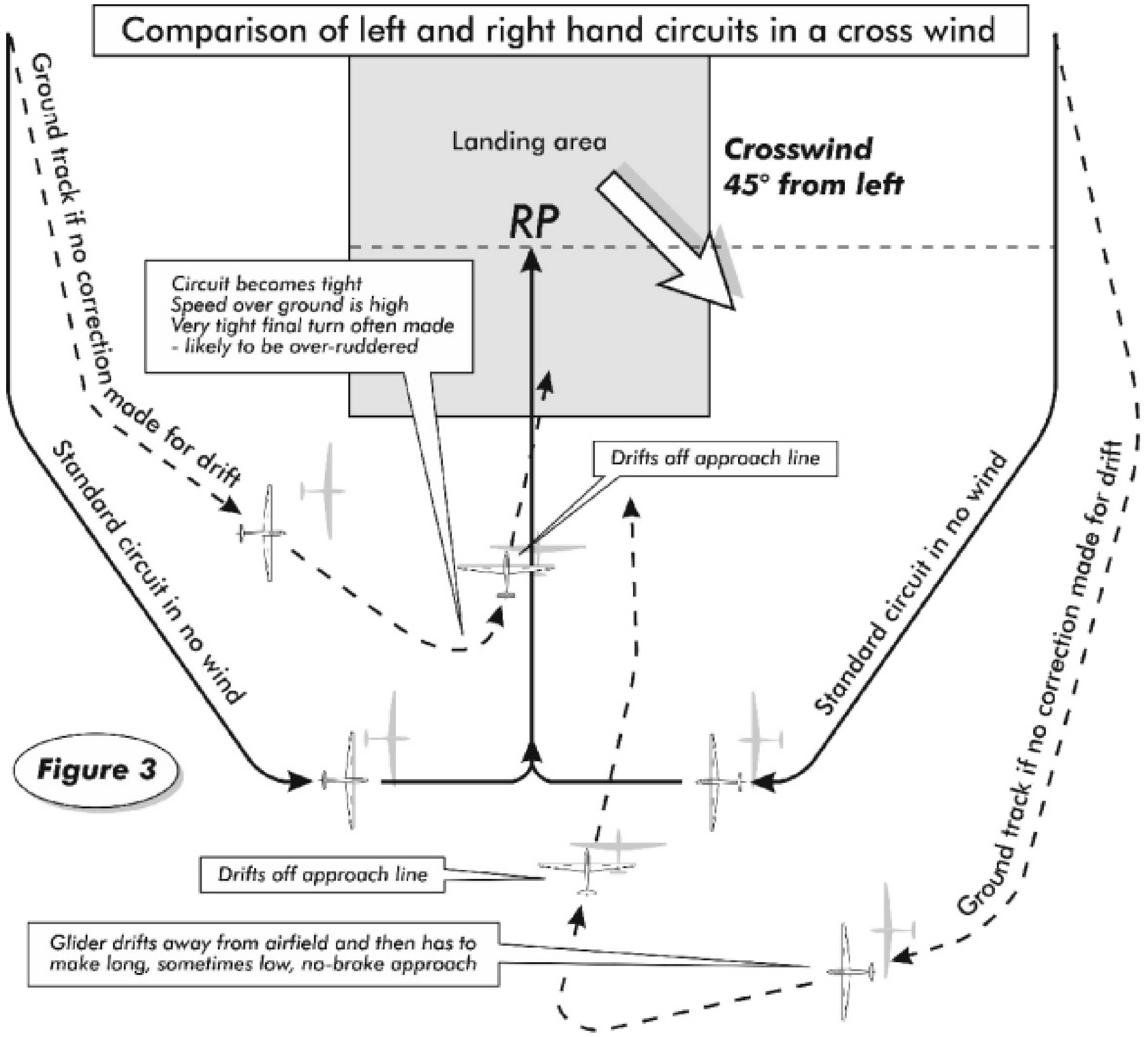
As the glider passes low key it will start to fly away from the RP/landing area. At this point, the glider is turned onto the diagonal leg. The turn should be about 45 degrees but is flexible. The diagonal and base legs are used to make sure the final turn happens in the correct place. Continue to assess the angle to the reference point and make any adjustments necessary. If the angle is too shallow or decreasing then turn in a bit more; if too steep, a smaller turn or even widening out the diagonal leg will take you further back from the landing area. Airbrakes can be used at any time to correct a situation resulting from excess height.

<u>Effect of Wind</u>

The wind can have a significant effect on the circuit and rarely blows exactly down the runway. A strong wind increases the ground speed as you fly downwind, thus reducing the time available to assess and make adjustments. A cross wind will either work to slacken or tighten your circuit (see Fig 3, next page).

Whilst flying downwind the glider's heading must be adjusted such that you follow the correct downwind track; a slackening crosswind will drift the glider away from the circuit requiring the nose of the glider to be pointed in towards the airfield, whereas a tightening wind will drift the glider towards the airfield requiring a heading correction away from the airfield. This latter condition leads to potentially losing sight of the landing area/RP much earlier as you pass Low key.

As you turn onto the diagonal leg the effect of crosswind changes. The slackening crosswind may produce a headwind component on the diagonal leg and a definite headwind component on the base leg. This increase in headwind



component reduces groundspeed and therefore increases the time taken to fly to the final turn point. With a tightening wind turns immediately into a tailwind component which continues to tighten the diagonal and base legs, increases groundspeed and reduces the time taken to reach the final turn point. This can be a significant threat as it can lead to not anticipating where the final turn needs to start such that a dangerously high angle of bank is used, risking an accelerated stall/loss of control. The effect of crosswinds can, of course, be anticipated by good situational awareness. If required, a tighter downwind leg can be flown with a slackening wind whereas a tightening crosswind can clearly be countered by a wider downwind leg to give a sensible available time for the diagonal/base legs; REMEMBER, the diagonal and base legs are where you make your final adjustments to ensure the final turn happens in the correct place.

Generally speaking, a circuit on the downwind side is usually preferable. The corrections for drift give you a better view because you crab towards the landing field not away. The headwind component on the base leg makes that part of the circuit less rushed, and the final turn position is easier to judge because there is less risk of overshooting it.

APPROACH CONTROL

The descent path of the glider during the final approach is adjusted using the airbrakes (or spoilers). Once opened, the airbrakes significantly increase the descent angle, or put another way, reduces the glide angle. As an example, an

ASK21 typically has a best glide of around 34:1 which reduces to around 8:1 with full airbrakes; the increase in drag and increase in glidepath makes it easier to fly an accurate approach to the RP.

The variation in glide angle between zero and full airbrake is referred to as the approach funnel. Trying to fly an approach in the bottom of the approach funnel, i.e. close to the ‘no brake’ line, is high risk, as it is difficult to judge and leaves no margin if an undershoot develops. The aim is to fly the approach in the upper part of the approach funnel, looking to use half to two thirds of the airbrake’s effectiveness. If overshooting, the airbrakes can be extended further to increase the glide path angle. If undershooting, the airbrake can either be reduced slightly for a minor undershoot or be put away and fly to a steeper angle before extending them again and re-establishing a corrected glide path.

To add to the complexity of approach control, the strength of the headwind component directly affects the achieved glide performance (Figure 4). Thus, the half/two-thirds effective airbrake approach angle is constantly different as the wind strength differs on almost every approach.

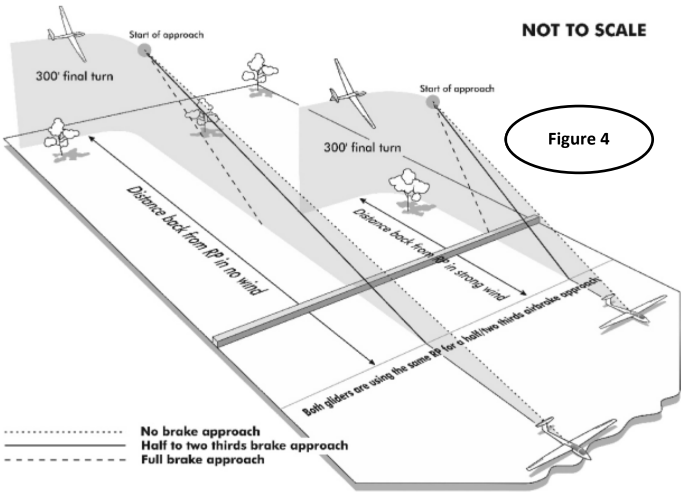


Figure 4

on the ASI with a Yellow Triangle. However, it is important that the flight manual is referred to for type-specific advice.

Pilots are often confused about what speed to use on the approach and what they are trying to achieve. At best this confusion leads to slow progress for trainees and at worse causes accidents either during training or post solo. It is vital trainees are briefed on approach speeds and the effects of wind gradients prior to attempting to teach approach control or landing. They must understand the following:

- **Landing speed** – The speed the glider touches down at, normally close to the 1g stall speed for a fully held off landing.
- **Speed required for a round out** – The minimum speed the glider can achieve a round out on level ground with clean wings. This information is in the flight manual and often quoted as the minimum approach speed or marked on the ASI with a yellow triangle, however the flight manual should still be consulted for any special conditions. Provided we have this speed or more we will be able to achieve a round out irrespective of the wind speed.
- **Approach speed** – If approaching into a headwind there will usually be a wind gradient down the approach, which will act to rob airspeed from the glider. For this reason we add extra speed for the approach in excess of minimum approach speed. It is normal for this 'extra' speed to decay in the last 50 to 75ft of the approach. Provided we have our minimum or yellow triangle speed for the round out then we will be OK.

When deciding how much extra speed is required, use minimum approach speed + half the headwind component. Additional speed may need to be added for turbulence/gusts, wing contamination or landing up slope. It is normal practice in the case of gusts to add the 'gust factor,' so for gusts of 10kts **above the steady wind speed you** would add 10kts. However, unless your airfield is equipped with an accurate anemometer, these calculations can only be based off a 'best guess,' and in the situation of an airfield experiencing rough rotor conditions, the wind affecting the glider pilot is changing constantly.

Be aware, that if the result of the pilot's approach speed calculation is exceeding 70-75kts (40-50% over a 50kt yellow triangle speed), it is likely to be excessive at the majority of airfields. High approach speeds bring about a significantly

The final approach starts when we roll out of the final turn at a sensible height for the conditions and preferably no lower than approximately 300ft. The final turn should occur far enough back from the landing area that the glider can be flown towards the RP and into the ideal part of the approach funnel. Correct alignment of the final approach track should be established taking into account any crosswind and then, as the correct descent path is reached, the airbrakes should be smoothly opened to the half/two-thirds position and checked visually, the attitude adjusted to maintain approach speed, the glider's trajectory allowed to stabilise and then assess any movement of the RP. A continuous scan should then occur: **Alignment – Attitude – Airspeed – Reference Point**. Any deviations should be quickly assessed and corrected and the scan continued until approaching the flare.

The most common method of coping with a crosswind is the crab technique where the nose of the glider is pointed into wind such that the glider **TRACKS** down the final approach course in balance (yaw string centred). This is maintained until the flare when the glider is aligned with the direction of travel using the rudder.

<u>Use of Flaps</u>

If flaps are fitted, their setting will also affect the glide angle; the more positive the setting increases the wing camber, leading to greater lift, greater drag, a lower stalling speed and a lower nose attitude; the latter giving the pilot a better view of the RP and landing area. The most positive setting is usually known as landing flap and will allow the lowest approach speed and shortest landing distance but often leads to a reduction in roll response. Therefore, landing flap may not always be the most appropriate setting in gusty conditions. During the pre-circuit checks, **F** should be a consideration of what flap setting will be used and not a cue to set them; this should be done at an appropriate time prior to intercepting the final approach path.

<u>Determination of Approach Speed</u>

Approach speed in any aircraft is primarily determined by weight, landing configuration and wind conditions. It is based on a reference speed which is 1.3 times the 1g stall speed; this gives a base line approach speed which can then be corrected for wind and other factors. In most sailplanes this figure is worked out by the manufacturer at MAXIMUM WEIGHT without water ballast and is depicted

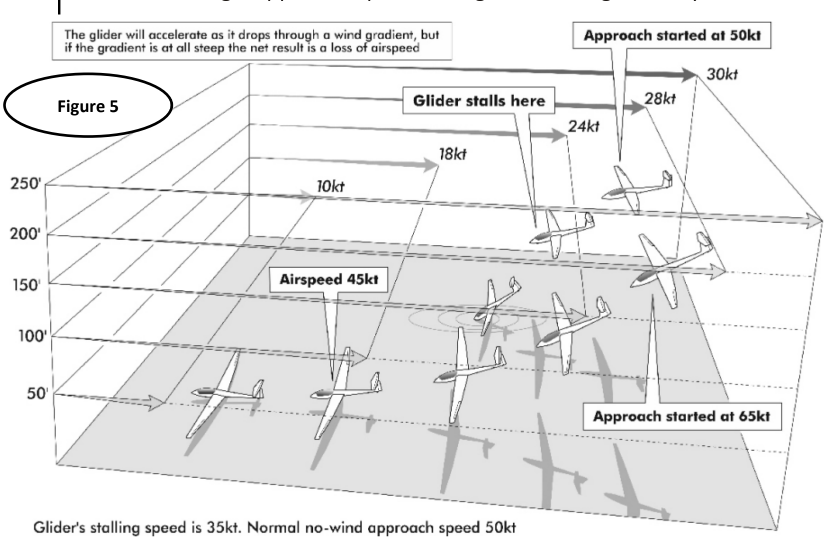


Figure 5

Glider's stalling speed is 35kt. Normal no-wind approach speed 50kt increased rate of descent from which the flare needs to be anticipated and actioned earlier than from a normal approach. Pilots often believe they must maintain all this extra approach speed down to the point of flare leading to them either diving through the wind gradient resulting in an increased rate of descent and a late sharp flare, or they start reducing the airbrake setting in the last 50ft. Both these habits lead to excessive speed for the flare and the result is ballooned/bounced landings, under shooting, PIO, a long float, or all the above.

In summary:

- Determine minimum approach speed (Yellow triangle/aircraft flight manual).
- Nominate **minimum acceptable** approach speed (minimum approach speed + allowance for contamination/runway upslope.
- Nominate **target** approach speed (wind corrections including gusts/turbulence as required).
- Do not carry excessive speed!

Strong Winds and Wind Gradient

The wind tends to increase with height. In strong wind conditions this increase in wind speed can be significant and therefore the approach needs to be flown at a much steeper angle to allow for the decrease in groundspeed and increase in approach speed. As you descend through the wind gradient the wind component reduces which will lead to a decrease in IAS (Figure5).

If a sensible approach speed has been selected there will be a safe margin above the minimum acceptable approach speed for you to take corrective action and recover the airspeed; this might require a lowering of the attitude along with a reduction of airbrake.

If the wind is gusty then we should have chosen an approach speed that adds a gust factor as previously described and which keeps the glider above the minimum acceptable approach speed. You will experience IAS variations above and below the selected approach speed. Trying to correct the speed by reacting to every gust invariably leads to destabilising the approach, the constant attitude and airbrake changes will make it impossible to fly the approach accurately to the RP. Gusts, by their nature are exactly that, momentary changes in wind speed; maintain the selected attitude and accept any variations in IAS caused by gusts and allow the speed to recover. REMEMBER – this is WHY we added a gust factor, to keep us above the minimum acceptable approach speed. If you arrive at the flare with an IAS above the minimum acceptable approach speed you should have enough energy to flare!

In certain conditions, windshear can be experienced where the wind speed or direction can change suddenly leading to an instant change in airspeed. In essence, windshear can be viewed as the most extreme gusts where a sensible choice of approach speed is most important. But note that windshear conditions can be extremely dangerous for any aircraft when close to the ground. If experiencing a marked loss of airspeed on approach, the airbrakes should be fully closed and the nose lowered if there is enough height to do so; the action of closing the airbrakes will, in isolation, restore energy/speed sufficient to flare the glider.

LANDING

As the glider approaches the reference point the rate of descent needs to be arrested such that the glider transitions smoothly to level flight just above the ground; this is commonly known as the ‘round-out’ or the ‘flare.’ The exact point at which the flare starts is dependent on the steepness of the approach path and the approach speed as these factors can vary the rate of descent considerably. The greater the rate of descent, the earlier the round-out should be initiated. To judge when to commence the flare, the pilot must transfer their focus from the reference point and look towards the end of the runway. This allows them to judge closure with the ground, continue tracking in the required direction, and achieve the correct landing attitude.

From the start of the flare the airspeed will be reducing and therefore the attitude needs to be adjusted by a continuous nose up elevator input to maintain level flight just above the ground. If landing up a slope, a slightly higher approach speed should be used as the glider needs to be flared more to achieve level flight along the upslope. Commonly called the ‘hold off’, this is maintained until the glider reaches the correct landing attitude when the attitude should be held and the glider will sink on to the ground; the aim is to touchdown on the tailwheel/skid and the mainwheel at the same time; this will occur shortly before the stick reaches the back stop. This is referred to as a ‘fully held-off landing.’

Pilots sometimes mistakenly say that the glider is being stalled onto the ground. Whilst the airspeed is decreasing and the symptoms of the approaching stall are evident; the glider actually sinks onto the ground before stalling speed is reached. To stall, the glider would need to reach the stalling angle of the wing, commonly around 15 degrees. Few gliders sit with the tail and mainwheel on the ground with the wings close to an angle of 15 degrees.

If a crosswind is present, once transitioned into the ‘hold off’ the pilot should align the glider with a smooth rudder input and maintain the wings level using ailerons. If this alignment is done too early the glider may start to drift downwind before it has landed; in this case the into wind wing may need to be lowered slightly to stop the drift.

Once on the ground, the glider should be maintained straight with the rudder, with the wings level and the stick smoothly moved fully back until the glider has stopped; this latter action will keep the tail firmly on the ground aiding directional control, and also for gliders with nose wheels such as ASK21s, keep as much weight off the nosewheel until the lowest possible airspeed. Wheel brake should be used as required to bring the glider to a safe stop.

Short Landing Procedures

Short landing procedures are a requirement of the SPL syllabus and link accurate approach and landing techniques with the practicalities of field landings.

If the landing area is restricted due to size, an RP is initially planned about one-third of the distance into the area. Once a stable approach has been established, the amount of airbrake can be increased to bring the RP safely back towards the boundary of the available landing area, thus maximising the landing distance available. Once the glider is on the ground, the wheel brake is used to bring it to a halt in the shortest possible distance, minimising the risk of hitting an unseen obstruction.

AIR EXERCISE BRIEFINGS

The three elements of Ex 12 should be taught as separate lessons and will be covered as such below. As with all flying exercises, once a level of proficiency has been achieved, the elements should be combined appropriately. NEVER attempt to teach both approach control and landing together – there is too much information to take in.

Nothing in Ex 12 will be a new experience for the trainee as they will have seen every element on every flight they have completed to this point. You are building on an existing level of knowledge from the start. Do not assume, however, that they understand what has been happening thus far. Remember this is a judgement exercise and it is highly likely that, although they may have been flying parts of the circuit, the instructor will almost certainly have been making the judgement calls and directing the trainee with significant prompting.

CIRCUIT PLANNING

AIM: To fly a safe circuit resulting in a final turn at an appropriate height and position.

Check that the trainee has received a thorough ground briefing and understands the concepts of circuit planning and judgement and what they are trying to achieve.

TEM

Threats:	**Management:**
Collision	Maintain thorough lookout scan
Errors:	
Running out of height for appropriate circuit	Monitor height & position
Not recognising effect of wind or a changing wind.	Consider effect of wind prior to commencing circuit

MANOEUVRE DEMONSTRATION

In demonstrating and practising circuits at this stage, conditions need to be as ideal as possible. Strong winds and/or significant crosswinds should be avoided.

For the initial demonstration, the trainee should be watching and not following through on the controls or flying the glider.

Set the glider up in a suitable position, upwind of both the airfield and the high key position. Explain what you are doing, how you are assessing the wind, selecting your landing area/RP, and assessing other landing options in case your chosen area becomes obstructed.

Assess the wind and its effect on the circuit.

Agree a target and minimum acceptable approach speed (this might already have been done prior to launch).

Complete the pre-circuit checks – WULF (recommended).

Join the circuit at high key pointing downwind. Fly the circuit such that it reflects the 'ideal' circuit with regards to height, distance out and angles to the reference point. Describe where you are looking and that you are assessing your height/distance/angle from the reference point whilst emphasising your lookout scan, especially outside the circuit and across at the opposing circuit. (You should not assume every aircraft will be flying the same pattern.). As you reach low key, point out that you are now level with the reference point and that you have set and re-trimmed for the approach speed. This is a convenient point to identify the airbrake lever and place your left hand on it (so there is no scrabbling for it later and possibly confusing it with the gear retraction lever).

The turn onto the diagonal leg should be made shortly after passing the low-key area. The diagonal leg should be used to ensure the height/angle/distance to the RP remains satisfactory. If the angle appears to be shallowing off the diagonal leg can be adjusted in towards the airfield; conversely, if the angle appears to be too steep the diagonal leg can be adjusted slightly away from the airfield. The attitude/airspeed should now be monitored every few seconds. Continue to emphasise an effective lookout scan especially outside of the circuit, on the opposite circuit, and further out on the approach track.

The base leg should be flown to ensure the final turn occurs to allow the correct approach control technique to be used as described in the next section. Height/angle/distance assessment and attitude/airspeed monitoring continues and the base leg can be adjusted to tighten or slacken the circuit as on the diagonal leg. Airbrake can be used effectively but with care at any stage on the diagonal and base legs if too high, however, a good circuit demonstration with good positioning should not require this.

The turn onto the final approach should be anticipated such that a normal banked turn can be made to roll out aligned with the selected approach track.

Emphasise effective lookout approaching the final turn.

Now just fly the approach and landing without further patter; you have completed the circuit demonstration at this point, so do not distract from it by describing other exercises.

If you manage to demonstrate the 'perfect' circuit as per this manual/the Student Pilot Manual – fantastic – the student now has a model to follow. However, achieving the 'perfect' circuit every time is highly unlikely. You MUST NOT attempt to fly the 'perfect' circuit where the conditions result in either a cramped final turn or, more dangerously, far too low, or too far out; this would not be flying by example. You MUST ensure you fly making corrections appropriate to the conditions, describing WHAT is happening and WHY you are doing something. For example, you might encounter lift as you fly downwind putting you high on your diagonal/base leg; the correct action in this case may be to widen out your circuit, possibly combined with using airbrake to lose height to correct to a more appropriate height. Conversely, you may encounter sink and find yourself running out of height such that you have to turn in early and land further up the airfield than originally planned. In cases like these where conditions require corrections to be made, it is absolutely ESSENTIAL that an instructor demonstrates the CORRECT action to achieve a SAFE outcome. In the subsequent debrief you should reflect on what has just occurred, assess what the trainee understood by asking them what they remember and explain your decisions and actions. You have just demonstrated good situational awareness and decision making, the very competencies your trainee needs to develop to successfully fly this exercise.

If you assess that your demonstration strayed too far from the 'perfect' circuit, it is essential another demonstration be flown; consider whether this should be delayed to a time when conditions become more appropriate.

THE ZIG-ZAG CIRCUIT DEMONSTRATION

The Zig-Zag circuit is not a type of circuit; it is a tool for the instructor to assess the trainee's judgement and should be flown after the trainee has had a few attempts at the circuit themselves It is intended to show what it looks like if the glider is either too close or too far away for the height available and should be used to assess the trainee's judgement. (Fig 6).

Position the glider about 900ft in the High key area; point out that the height/distance/angle is correct.

Fly in towards the airfield. Point out that the height/distance/angle relationship is wrong and the glider is **TOO CLOSE** and not too high.

Turn the glider so that you widen out the circuit. Point out to the trainee that the angle is reducing and the distance increasing; ask the trainee to judge when the glider achieves the correct height/distance/angle. If height permits, continue to widen out the circuit beyond the ideal and highlight that the glider is **TOO FAR OUT** for the height available.

Demonstrate that the correct action in this situation is to turn back in positively to immediately correct the error and to try and rejoin the correct profile; ask the trainee to judge when the height/distance/angle looks correct. If getting too low, demonstrate the correct action by cutting the circuit short and land further up the airfield. The risk here is the **ERROR** of becoming too low or too far out.

Care MUST be taken to ensure the Zig-Zag circuit demonstration does not result in a dangerous situation or an inadvertent land-out. It can be a challenging exercise to fly in one attempt, especially in a conventional glider and a TMG is ideal to use if one is available. It may be better to split the demonstration into two parts; ensure the elements are not rushed and the training objectives of assessing the trainee's judgement are achieved. A light wind day makes the demonstration easier to fly and gives the trainee more time for assessing changes of angle.

MANOEUVRE LESSON

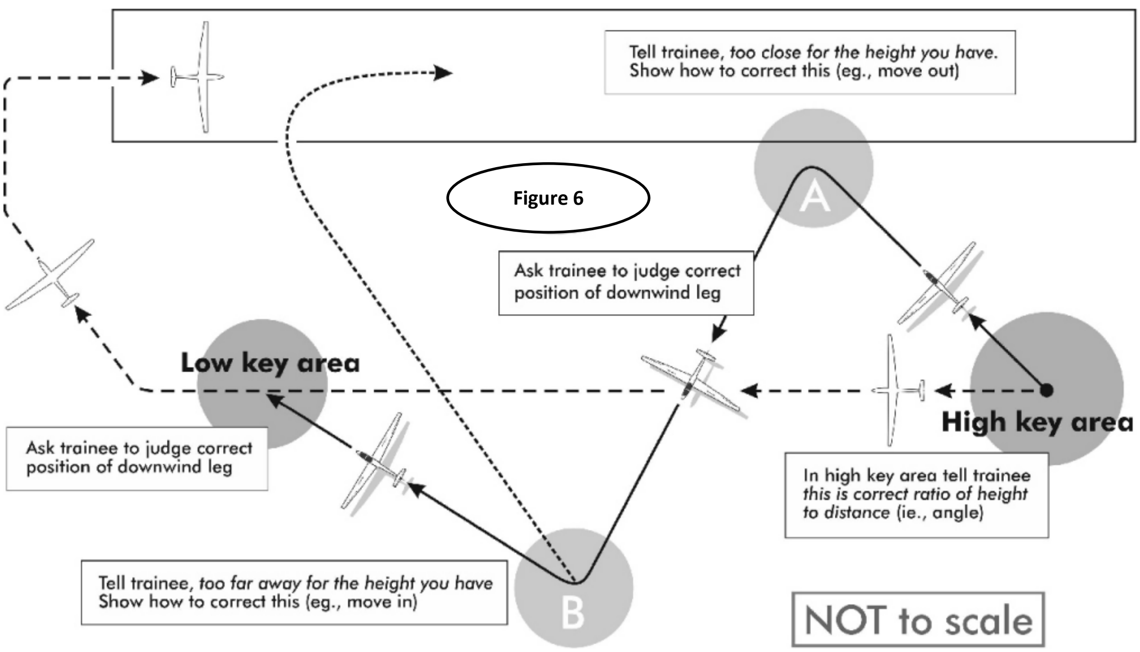
The trainee should try to fly a standard circuit as demonstrated. Make it clear in the exercise briefing that one of the main training objectives of circuit planning is for them to assess the conditions, to recognise when the height/distance/angle is not correct, and to make suitable corrections. Once in the air, prompts need to be minimised. Allow them to recognise any deviations and to make appropriate corrections; constant prompting around the circuit by the instructor is distracting and means that the instructor is ultimately making the decisions. Clearly you need to intervene at an appropriate moment and at an appropriate level, but if they are doing okay, leave them alone.

Initial trainee attempts are likely to see a deterioration of flying accuracy due to the increased workload so you may need to remind them to fly the glider. It is likely they will be able to replicate the correct height/angle/distance, especially immediately after your demonstration. An indirect prompt such as *"What do you think of your angle and distance?"* can help compare their perception to your own. If they recognise it is wrong but not doing anything about it, you need to encourage the decision making by asking *"What are you going to do about it?"*

As they progress you will need to introduce various unusual or awkward circuit situations to allow them to develop their judgement and decision-making skills.

Such situations could consist of:

- arriving at high key lower or higher than usual.
- commencing the circuit from too close in.
- being too low or too far out to reach the high key area.
- encountering sink resulting in running out of height (simulated by using the airbrakes).



To check that the trainee is not over-reliant on the altimeter, fly an exercise with the altimeter covered up.

It is essential that the trainee can deal with any of these scenarios. Whilst it is great to have one who can fly a model circuit time and time again, it does not prove their ability to recognise and respond correctly to deviations.

A TMG is useful for covering the early demonstrations and trainee attempts at circuit planning. A flight of 30 – 45 minutes can provide some consistency without having to wait until the next glider flight. The circuit only needs to be flown until the final turn has been completed then the instructor can take-over, perform a go-around and reposition for another attempt. To ensure the trainee is not overloaded, an initial TMG session could include the instructor demo, some trainee practice, finishing with the zig-zag circuit demo which can be broken down into two parts to prevent it being rushed. A second TMG session could be used to look at awkward circuit scenarios. Practice on a simulator can also be helpful – and very cost-effective – provided the setup provides a sufficiently wide field of view.

Whilst allowing the trainee scope to make errors, identify and correct them, you must ensure they do not take you beyond your ability to recover the situation. It is very easy to let them get too far out of position and as you progress beyond Low key, you have little excess height and time to sort out significant errors, especially if the airfield you fly from has fewer or restricted landing options.

Most importantly, You MUST ensure that if the trainee makes any safety error at a CRITICAL stage of the circuit, you MUST:

- TAKE CONTROL and recover safe flight path.
- DO NOT hand control back to the trainee.

DE-BRIEFING

It is important that you establish what the trainee saw and how they corrected errors, even if the outcome was successful. They may not make adjustments in the same way you, as an experienced pilot would, but the overall outcome may be a safe approach. This is a good opportunity to discuss their decision making. If their decisions led to instructor intervention, then it is important they understand why.

Ensure you praise positive examples whilst being constructive when highlighting examples of poor decision making. If it is clear the trainee does not understand what they are trying to achieve, ensure they are re-briefed and re-taught.

COMMON DIFFICULTIES

Trainees often recognise their position in the circuit is incorrect but then fail to take any action to correct it. A suitable direct question to gauge their assessment and what they need to do about it might be appropriate at this stage but keep any questioning as brief as possible.

The trainee may have a tendency towards cramping their circuit. Certain gliding sites have local conditions which often lend themselves to tight circuits which the trainee often sees as the normal, especially if their instructors set the wrong example by flying tighter circuits normally. It is imperative that trainees have any tendency towards cramped circuits corrected.

It is possible that the trainee’s standard of flying may deteriorate when they start circuit planning. Do not forget that they are now having to exercise judgement and make decisions which will increase their workload. Be patient with them. If necessary, break the exercise down into bite-sized chunks by flying the glider yourself so they can concentrate on the decision making and reintroduce them to the handling when they have a bit more capacity. If they require frequent prompts or you are having to take control it is likely that circuit planning has been introduced too early.

Some trainees may have the ability to vocalise their thoughts and decisions. If they can it might help you work out what is happening, but do not insist on them doing so as it may overload them.

Some upper air exercises immediately prior to joining the circuit can overload or disorientate the trainee during their early attempts at circuit planning.

