

12b – APPROACH CONTROL EXERCISES

APPROACH CONTROL AIR EXERCISE BRIEFINGS

The aim of the approach control lesson is to teach the trainee how to fly a safe approach using the correct technique to enable a safe landing in a chosen area.

DO NOT try and teach approach control and landing at the same time.

The first element is to cover the effects and use of airbrakes (and spoilers). The trainee will have seen them being used but it is important that they not only know HOW they affect the handling and performance of the glider, but also how they are used to adjust the approach path whilst maintaining approach speed.

Point out that the **descent path** is controlled by the **airbrakes**. The **approach speed** is controlled by the **elevator** with reference to the **attitude and airspeed**.

The effect the airbrake has on the glider's natural stability is dependent on the position of the airbrake on the wing and this affects the change in the wing's centre of pressure as the airbrakes are opened and closed. With airflow over the wings, the airbrakes will open easily (suck out) once unlocked; the higher the speed or angle of attack they are unlocked, the greater the tendency to open suddenly. Different glider types have different responses but that the effect on airspeed, attitude and trim is minor and easily controlled.

The approach funnel and reference point technique should be recapped, highlighting the objective of a half to two-thirds airbrake approach. Stress the importance of establishing and maintaining the correct final approach track **alignment** and then, once the angle to the RP looks correct, smoothly opening the airbrakes (encourage a quick glance to see how much airbrake is actually extended), adjusting the **attitude** to maintain the **airspeed** and assessing any movement of the **RP**. This establishes a suitable scan (**Alignment – Attitude – Airspeed – Reference Point**) all the way down the approach until the flare.

Assessing overshoot and undershoot by movement of the RP in the canopy can only be done if the **attitude and airspeed are stable**.

The appropriate technique to correct both situations should be discussed. The **primary method to recover from an undershoot is to close the airbrakes**, fly towards the RP until a steeper angle is seen and then re-establish a half/two-thirds airbrake approach. Only when a small undershoot is apparent is it acceptable to reduce the airbrake setting slightly to make a correction. Constant reduction in the airbrake setting, however, can lead to a **shallowing approach** where the glider is dropping lower and lower in the approach funnel; this is a **hazardous situation** which must be avoided.

Reassure the trainee that it is very rare for any glider pilot to get the correct approach angle/airbrake setting correct at the

first attempt and it is absolutely normal to have to make some correction on most approaches.

TEM

Threats:

Collision

Mitigation:

Maintain thorough lookout during all phases of the circuit and approach

Errors:

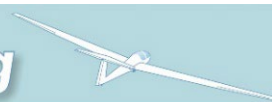
Shallowing approach due to incorrect technique during undershoot scenario.

Ensure correct technique used

Instructor failing to take control in time

When trainee makes an error at a critical stage of flight, the instructor **MUST** take control

The Flying



AIRBRAKE DEMONSTRATION + LESSON

Upper air exercise

THREAT – This lesson leads to a large loss of height. Check you have sufficient height before starting and monitor the height loss and distance from the airfield.

The first element of the lesson is to **demonstrate** the **effect** of the airbrakes.

Trim the glider for the **approach speed** and then release and guard the stick. Slowly open the airbrakes to between half and two-thirds. Draw attention to:

- Any change in attitude and speed that occur.
- The increased rate of descent.

Now open the airbrakes fully and draw attention to any changes to the same points above.

Whilst continuing to guard the stick, smoothly close and lock the airbrakes, again drawing attention to:

- Changes in attitude and airspeed.
- The reduction in sink rate.

The second element of the lesson is for the trainee to learn **how** to operate the airbrakes whilst maintaining a **constant airspeed**. Trim the glider for the **approach speed**. Get the trainee to **follow through** and slowly open the airbrakes to around half to two-thirds whilst **adjusting the attitude** if required to **maintain** the approach speed. Get them to glance

at the airbrakes to see how far they are extended and then back to the **attitude and airspeed**. Open the airbrakes fully maintaining the approach speed and then whilst continuing to maintain the approach speed, smoothly close and lock the airbrakes.

The instructor should continue to fly the glider at the approach speed whilst the trainee opens and operates the airbrakes over their entire range including closing and locking them. Draw the trainee's attention to:

- Any tendency for the airbrakes to suck out.
- The force to move the airbrake lever comparing the air loads to those on the ground.
- The force required to lock the airbrakes.

The trainee should then practice flying the glider, maintaining the approach speed whilst unlocking the airbrakes and operating them smoothly over their full range. They should also be able to close and lock the brakes. Allow the trainee sufficient practice to achieve **proficiency** in all elements of this exercise as this is a basic but essential skill before moving on to the next stage.

One final exercise for the trainee to practice is for them to accelerate the glider towards maximum manoeuvring speed (Va) and then smoothly open the airbrakes fully to experience the operating forces.

AIRBRAKE LESSON DEBRIEFING

Remind the trainee that:

- the **descent path** is controlled by the **airbrakes**. The **approach speed** is controlled by the **elevator**
- the effect of the glider's airspeed on the airbrake operating forces and the need to keep one's hand on the operating lever to prevent the airbrakes from extending beyond the desired position.
- they must perform an adequate scan to fly and maintain the nominated airspeed.

Discuss any difficulties experienced in unlocking, locking, or operating the airbrakes. If so, their reach may be compromised by an incorrect seating position.

Advice to Instructors

The airbrake demonstration and lesson use large amounts of height. You may need several flights to allow the trainee to achieve the correct level of proficiency. If the trainee does not master this skill, they will struggle later on.

APPROACH CONTROL LESSON

The approach control lesson comprises the following elements:

- Revision of the use of airbrake (required if not completed directly before).
- Demonstration of a normal approach.
- Demonstration of the undershoot and overshoot and how to correct to a normal half to two-thirds airbrake approach.
- Trainee practice.

During the demonstrations and initial trainee practice, the instructor should fly the glider and arrange for the final turn to occur slightly higher and slightly further back from the RP than normal (an extra 200ft will suffice). **Note:** appreciation of approach angle can be more difficult if the glider is a lot further back than normal – you need enough time to highlight the teaching points.

Demonstration of a Normal Approach

Roll out of the final turn **aligned** with the final approach maintaining the correct **attitude and airspeed**. Continue to fly towards the RP until intercepting the half to two-thirds airbrake approach path. Example patter could be:

- 'I'm going to demonstrate a normal approach to you – please follow through.'
- '**Aligned** with the approach track, maintaining XX knots.'
- 'Two-thirds airbrake - **NOW** - glance at them.'
- 'Note where the reference point is in your canopy – it isn't moving.'
- '**Alignment – attitude – airspeed – reference point.**'

Demonstration of an Overshoot

Establish on a normal two-thirds airbrake approach before reducing the airbrake setting to **establish a clear overshoot**. Then increase the airbrake to return to a normal approach. Example patter could be:

- 'I'm going to demonstrate an overshoot and how to recover to a normal approach – please follow through.'
- 'Settled on a normal approach I will now reduce the airbrake - adjust the **attitude - airspeed** about right.'
- 'How is the reference point moving?'
- 'This is an **overshoot.**'
- 'I'm now increasing the airbrake to correct the glidepath – glance at them.'
- '**Alignment – attitude – airspeed – reference point.**'

If the use of full airbrake still results in overshooting the RP, the approach should continue to be flown at the correct **attitude and airspeed**, accepting that the original RP will be overflowed resulting in a longer landing; a dive towards the RP allowing the airspeed to increase is not the acceptable technique.

Demonstration of an Undershoot

Roll out of the final turn **aligned** with the final approach maintaining the correct **attitude and airspeed** but **before** intercepting the half to two-thirds airbrake normal approach path, open the airbrakes fully **establishing a clear undershoot**. Then close the airbrakes and fly back on to the normal approach path (if sufficient height, this can be repeated once more), with half to two-thirds airbrake extended. Example patter could be:

- 'I'm now going to demonstrate an undershoot and how to recover to a normal approach – please follow through.'
- 'Before I reach the correct approach angle I'm going to open the airbrakes – glance at them – **attitude – airspeed** about right.'
- 'How is the reference point moving?'
- 'This is an **undershoot.**'

- 'Closing the airbrakes – glance at them – **attitude** – **airspeed** about right – fly in towards the correct angle.'
- 'That looks about right – reselecting the airbrake – glance at them – **alignment** – **attitude** – **airspeed** about right – **reference point**.'

It is possible to combine the overshoot/undershoot demonstrations into one approach but be aware that the trainee may not recognise what is happening for some time, which can lead to a rushed or ineffective demonstration. For the undershoot demonstration, choose an RP well into the field to cater for the possibility of landing short (TEM) which, if it happens, can be used in the debrief to reinforce the threat from undershooting.

For the initial trainee attempts, start the final approach at about the same height/distance out used in the demonstrations to give them time to assess.

- For the initial attempts, the instructor should fly the glider and **align** it on to the final approach track before handing control to the trainee.
- Initially, the emphasis will be on the trainee using the correct technique (**alignment** – **attitude** – **airspeed**) rather than focussing on flying to an accurate RP.
- The trainee should be able to recognise and make an appropriate correction to the approach path – accuracy will come with practice.
- If the glider drifts away from the final approach track, correct this first before the glidepath – **alignment** – **attitude** – **airspeed** – **RP**.
- Try and avoid making big corrections as you approach the flare.
- Whilst it may be necessary to prompt the trainee during their early efforts, be aware this can be hazardous. When the trainee is working at their capacity, a sudden prompt might elicit an unexpected and irrecoverable situation. It is often best to say 'I **HAVE CONTROL**' and **take over**.
- If the approach is not reasonably under control by 100ft, **take control**.

If the trainee makes an error at a critical stage of flight the instructor **must** take control – and do not hand it back.

DEBRIEFING

- Alignment of the approach track and corrections.
- Accuracy of attitude and speed control.
- Assessment of undershoot/overshoot.
- Correction of undershoot/overshoot and achievement of acceptable approach path.
- Wind gradient effects on approach speed control.

A simple way to think about it:

- On approach the target speed should be maintained.
- If overshooting, increase airbrake and **accept** the reference area may be overflown.

- If undershooting, put the brakes away **FULLY** and fly on until a two-third airbrake approach can be achieved.
- It is absolutely **normal** to misjudge the required approach angle initially and it is **okay** to have to make corrections.

REMEDIAL EXERCISES

Both of the following exercises are intended to show the importance of maintaining a constant airspeed when flying to a reference point. These demonstrations should only be shown to the trainee if it is felt they do not understand the need for a constant airspeed to be flown. The trainee **should NOT** follow through on the controls.

Exercise 1 – The Overshoot

- Choose an RP close to the downwind boundary of the landing area and make the final turn slightly higher and further back than normal.
- Open the airbrakes in the normal position but only use a small amount (maximum one-quarter).
- Maintain the RP in the same position in the canopy by gradually lowering the nose – do not alter the airbrake setting.
- Emphasise that the picture looks right with the RP static but that we are **failing to monitor** the airspeed.
- The airspeed will increase, slowly at first. Once it has increased by 15 to 20kts, '**realise**' that the airspeed is too high and adjust the attitude to slow down to the **correct airspeed** whilst increasing the airbrake setting. The result will be an overshoot and a long landing.

Exercise 2 – the Undershoot

- Identify a RP that is well into the field with a safe undershoot – you will almost certainly land in it.
- Select a slightly higher approach speed. If it is a 55kt approach day, use 60kts.
- At the appropriate time set up an undershoot by using full airbrake and maintain the RP in a constant position – comment that the RP picture looks okay but emphasise that we are **failing** to monitor the airspeed.
- The airspeed will slowly decrease. After losing a **maximum** of 10kts, '**realise**' that the airspeed is **too low**. If you are at a safe height (above 200ft) and over a safe landing area, lower the nose to retrieve the speed you've lost, but leave the airbrakes open and deliberately land short of your chosen RP.

THREAT – DO NOT allow the glider to get low and slow in this exercise. If you mistime the exercise discontinue it immediately – close the brakes and accelerate to a safe speed.

NOTE Both these exercises demonstrate the need to maintain a constant airspeed when using the RP technique.

COMMON DIFFICULTIES

Trainee has issues flying and maintaining the approach ground track alignment. This could be an indication that they are getting over-loaded, or the root cause might be as fundamental as they cannot fly in a straight line. Don't be afraid to revisit the basic training exercises such as the Straight Glide if required.

Aadjusting the airbrakes too frequently. The trainee needs to understand they should make an adjustment and let the glider settle before assessing whether a correction is needed. A re-brief on the effects of the airbrakes might be useful and/or a re-demonstration of the use of airbrakes whilst at height.

Closing the airbrakes in the final stages of the approach. Unless the airspeed is decaying unacceptably and there is insufficient height to lower the nose, ensure the trainee maintains the appropriate airbrake setting as they commence the flare until they have landed.

Opening the airbrakes as soon as they roll out on final approach – the 'going into land' lever. Reinforce that they must assess whether they have reached the correct approach path angle **before** they open the airbrakes. They may, of course, need to open the airbrakes immediately as they have cramped their circuit/base leg and is the correct decision – it is important that circuit planning is discussed to ensure the final turn is positioned correctly for the conditions.

Be aware of the power pilot converting to gliding easing the airbrakes in gradually to maintain a constant approach picture. This is a standard technique in powered aircraft but, of course, can lead to a shallowing approach in a glider.

The trainee may tend to drift laterally towards obstructions or the edge of the landing area. This is usually caused by the trainee not looking directly where the RP is, but at a feature or obstruction to one side. Ensure they are **aligned** with a suitable RP well clear of any obstructions and that they are looking at where they want the glider to go.