

BGA Instructor Reference Cards.

GLIDING These Reference cards are optimised for small smartphone screens, but can also be used on a tablet or clubroom computer. They can be printed out as cards and are arranged in a continuous pdf with links. Each chapter has Briefing points and Diagrams. You will find some web links to youtube videos on one of the exercises; these will be added to in new versions.

On the next pages is a table of contents. You can tap on each chapter heading to go straight to that chapter. Please note that the link will take you to that exercise, but you will have to scroll around to explore the diagrams (may be none, may be many) in that section.

Please remember that these cards form an aide memoir for the instructor. They do not tell anywhere near the full story. Reference to the BGA instructor manual from time to time is still required!

Any comments – – Stu@gliding.co.uk Diagrams used in these cards are drawn with thanks by Steve Longland.

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Ex. 5a - Primary effects of controls - Elevator

Briefing points:

Aim: To control the glider in pitch

TEM: Lookout, Handing over control, Following through

Explain:

- Normal gliding attitude and relationship with horizon (Diagram next section)
- How the elevator pitches the glider
- How we cannot keep pitching up stall

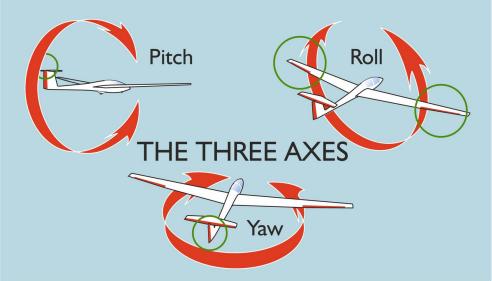
Air Demo:

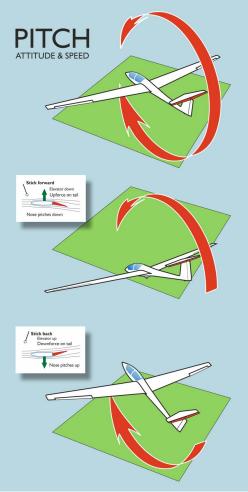
- Normal attitude
- Pitch down then up
- Show can't keep pitching nose up (if appropriate)
 - Return to normal attitude

Task:

- Task the student pilot (bite sized!) Common Mistakes:
 - Elevator is sensitive

Link to Elevator patter video





Ex. 5b - Primary effects of controls - Ailerons

Briefing points:

Aim: To control the glider in roll

TEM: Lookout, Handing over control, Following through

Explain:

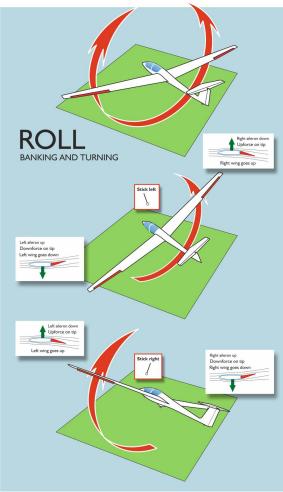
• Note normal wings level attitude and relationship with horizon (Diagram next section)

- How the ailerons roll the glider
- Maintaining the pitch attitude during roll Air Demo:
 - Lookout!
 - Wings level 'picture'
- Roll to a moderate angle of bank show new 'picture'
 - Use Elevator to maintain attitude
 - Lookout!
 - Roll wings level

Task:

• Task the student pilot (bite sized!) Common Mistakes:

Over banking due to continued aileron application



Ex. 5c - Primary effects of controls - Rudder

Briefing points:

Aim: To control the glider in yaw

TEM: Lookout, Handing over control, Following through

Explain:

- String and how it shows yaw
- Maintaining wings level and pitch attitude during demo

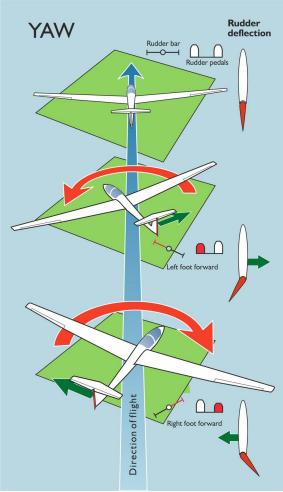
Demo:

- Coordinated flight with string central
- Yawed flight with string movement
- Point out nose swinging
- Point out track of glider still same as before

Task:

• Task the student pilot (bite sized!) Advice:

Demo and practice straight up and downwind



Ex. 6 – Coordinated rolling

Briefing points:

Aim: To coordinate Aileron and Rudder while rolling

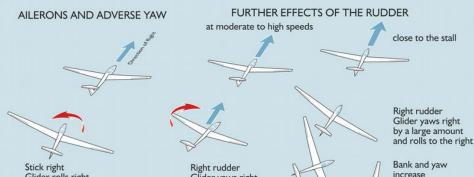
TEM: Lookout, Handing over control, Following through

Explain:

- Further effects of the ailerons (adverse yaw use of the string)
- How to coordinate Aileron with rudder Demo:
 - Lookout!
 - Adverse yaw
 - Using rudder with aileron to coordinate
 - Roll to medium bank angle
 - Use String to adjust
 - Lookout!
 - Roll wings level
- Coaching:
 - Student attempts to roll to and from moderate bank angles

Common Mistakes:

Obviously it takes students a while to coordinate accurately. Give them time.



Glider rolls right Yaws left Sideslips into uncoordinated turn to right

As speed increases the effect becomes less pronounced

Glider yaws right by a small amount and continues to fly on in the same direction as before, but sideways

increase Nose drops

> Spin or spiral dive

Ex. 7a - straight flying - Airspeed monitoring

Briefing points:

Aim: Flying at a desired airspeed

TEM: Lookout, Handing over control, Following through, range to the airfield Explain:

- Relationship between airspeed and attitude
- 'Chasing the ASI'

Demo:

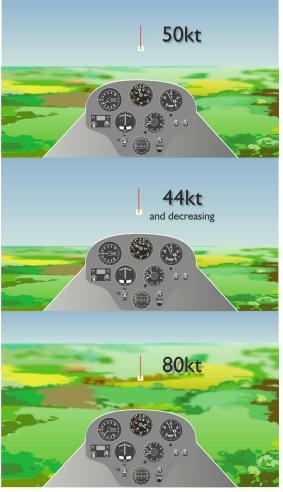
- Normal attitude and note airspeed
- Estimate attitude for another speed
- Notice it takes a while for stable speed

Coaching:

• Student attempts to fly at accurate nominated airspeeds

Common Mistakes:

Chasing ASI (use demo if required)



Ex. 7b – Straight flying - Trimming

Briefing points:

Aim: To trim the glider in Pitch

TEM: Lookout, Handing over control, Following through, range to airfield Explain:

- Revise airspeed monitoring
- Method of trimming by setting an attitude, ensuring speed is correct and then trimming to remove stick loads

Demo:

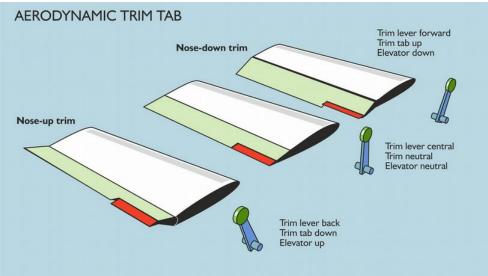
- Steady speed and attitude
- Student flies maintains a steady attitude
- Instructor alters the trim
- Student removes load from the stick by trimming

Coaching:

• Student attempts to trim at different nominated airspeeds

Common Mistakes:

Not holding the desired attitude while instructor demonstrates and student attempts to trim.



Ex. 7c – Straight Flying – Scan Cycle

Briefing points:

Aim: To maintain 'situational awareness'

TEM: Lookout, Range to Airfield

Explain:

- Cycle of Lookout, Attitude, Instruments
- Maintaining 'situational awareness'

Demo:

- Looking out pragmatically
- Flying wings level
- Scanning the instruments

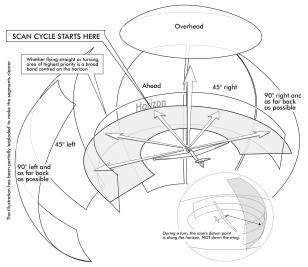
Coaching:

 Student progressively takes on more responsibility for lookout and planning the flight as regards range to the airfield and general situational awareness as their training progresses.

Common Mistakes:

Losing ability to scan using Lookout, Attitude, Instruments and Situational awareness due to workload. Not appreciating that coordinated rudder and aileron is needed even for small inputs.

THE SCAN CYCLE: Lookout Attitude Instruments



Ex. 8 – Turning using all three controls.

Briefing points:

Aim: To roll in and out of a medium banked turn in a coordinated manner at a set speed TEM: Lookout, Range to airfield, colliding Explain:

- Three turn stages; Going in, Staying in, Coming out
- Bring together all that you have learnt Demo:
 - Lookout!
 - Going in to a medium turn
 - Lookout!
 - Staying in attitude and bank angle
 - Lookout!
 - Coming out

Coaching:

 Student normally tries 'staying in the turn' first, then coming out, and finally, rolling in.

Common Mistakes:

Read the instructor manual!

SLIPPING

Use less bank or more rudder (adjust attitude with elevator)

> Direction in which glider is flying Direction in which it is pointing

SKIDDING

Use more bank

or less rudder (adjust attitude with elevator)

View from cockpit

Ex. 9a – Slow flight

Briefing points:

Aim: To fly the glider safely at minimum speed TEM: Lookout, Range to airfield, height loss, stalling

Explain:

- The symptoms of the approaching stall Demo:
 - Symptoms
 - Nose high
 - Speed reducing
 - Noise reducing
 - Controls less effective / feel different
 - Return to normal attitude
- Coaching:
 - Student contrasts slow flight with normal attitudes and other cues

Ex. 9b – Stalling

Briefing points:

Aim: To recognise and recover from a stall using as little height as safe

TEM: HASSLL, Spinning

Explain:

- Reasons for practising stalling
- The symptoms of the stall
- The recovery

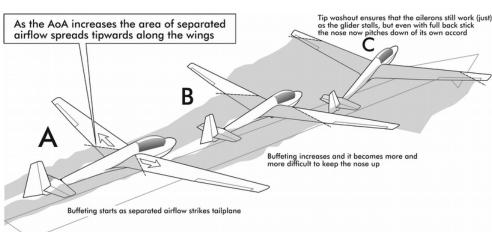
Demo:

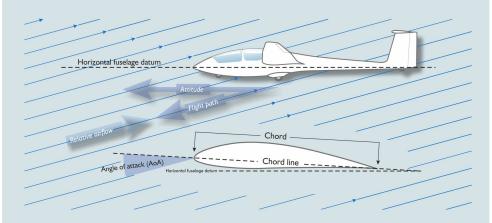
- Straight stall
- Wing drop stall
- Mush stall
- Recovery is the same for all Stick forward, Regain speed, Return to normal gliding attitude.

Coaching:

It's important to 'play around' with stalling on many flights. We are trying to show the student that stalling is 'no big deal' when up high, thermalling perhaps. It is a big deal when lower, but if it is played with while up high, the symptoms should be very clear.

• Student practises stalling and recovering <u>Contents</u>





© British Gliding Association and S N Longland 2017 Ex. 9c – Further stalling – Stalling speed increases in a turn

Briefing points:

Aim: To recognise that the stall can occur at faster speeds when turning

TEM: HASSLL, Avoiding terrain, range from airfield

Explain:

- Reasons for practising further stalling exercises
- Linking this exercise to previous Demo:
 - Straight, unaccelerated stall and get student to note buffet speed
 - Turn at 20, 40, 60 degrees and get student to note buffet speed

Coaching:

- Ensure the student understands the message - 'if you want to turn steep, you need the speed to do it!'
- Student can try to fly this, but it's demanding use your judgement.

Common mistakes:

Not comparing the speeds between straight slow flight to the buffet and the varying angles of bank. <u>Contents</u>

Ex. 9d – Further stalling – High speed stall

Briefing points:

Aim: To recognise that the stalling speed can increase when the glider is loaded with 'G' TEM: HASSLL, Avoiding terrain, range from airfield

Explain:

- Reasons for practising further stalling exercises
- Linking this exercise with previous Demo:
 - Straight stall student notes buffet speed
 - High speed stall a steep stall which is recovered from incorrectly (read I/Man)
 - Compare buffet speeds

Coaching:

• Ensure the student understands the message - 'if you load up the glider with 'G', it will stall at a higher speed.

Common mistakes:

These exercises are really illustrative if they are used in context. It is tempting to do them all in one flight – tick! Please try to link them to some current aspect of training – maybe winch launch failures or thermalling. <u>Contents</u> Ex. 9e – Further stalling – Low G not a reliable symptom of a stall

Briefing points:

Aim: To recognise that 'falling sensation' doesn't always mean a stall

TEM: HASSLL, Avoiding terrain, range from airfield

Explain:

- Reasons for practising further stalling exercises
- Linking this exercise with previous experience and training

Demo:

- Steep stall point out the glider IS stalled and the 'falling sensation'
- A higher speed 'push-over' glider not stalled – controls work – despite falling sensation.

Coaching:

• Message – just because you get falling sensation doesn't mean a stall!

Ex. 10a - spinning

Briefing points:

Aim: To recognise and recover from a full spin and spiral dive

TEM: HASSLL, Avoiding terrain, range from airfield, Overstressing on recovery Explain:

- Reasons for practising spinning and spiral dives
- Differences between spinning and spiral dive symptoms

Demo:

- Spin from under banked, over-ruddered turn, ideally with nose at the normal attitude
- Spiral dive from similar

Coaching:

- Student needs to be able to feel the glider during the departure and the spin and recovery. Coach the student to enter the spin and recover.
- Do not over-speed the recovery or overstress glider. Don't mistake spinning for spiral dive!

SPIN







A wing drops at the stall. The glider rolls rapidly towards it, and then descends, simultaneously pitching, rolling and yawing (auto-rotation)

Spin symptoms Nose down Rapid rate of rotation Low or flickering IAS Normal G Very high rate of descent Elevator won't raise the nose

SPIRAL DIVE

At the stall the glider rolls towards the dropping wing, but instead of spinning, goes into a steeply descending turn with bank and speed increasing A

Spiral dive symptoms

Nose down

- Low yaw rate
- Bank increasing
- Airspeed increasing
- G increasing
- All the controls work

E

Ex. 10b – Further spinning - Changing effect of the rudder at or near stall

Briefing points:

Aim: To recognise that the rudder is powerful and potentially dangerous if misused near the stall

TEM: HASSLL, Avoiding terrain, range from airfield

Explain:

• Reasons for practising this demo

Demos:

- Fly at a normal speed and deflect the rudder a measured amount (perhaps fully)
- Ask student how much yaw and roll?
- Fly just on the edge of the pre-stall buffet and use the same amount of rudder
- Ask student how much yaw and roll?

Coaching:

- Student can, perhaps must try this and get a feel for the exercise.
- Point out the dangers of misusing the rudder near the stall.

Common Mistakes:

Not holding the glider near enough to the stall to get it to roll. Also – its easy to 'cheat' by using the ailerons – don't! <u>Contents</u>

Ex. 10c – Further spinning - Spin off a steep or thermal turn

Briefing points:

Aim: To recognise that the glider can spin from a steep turn at quite high speeds TEM: HASSLL, Avoiding terrain, range from airfield, Over-speeding during recovery Explain:

- Reasons for practising this demo
- Linking with previous exercises (stalling speed increases in turn etc)

Demo:

- Describe a scenario perhaps distracted while thermalling launch failure etc.
- From a well banked turn, over rudder and load up the glider sufficiently to spin.

Coaching:

 Student can try this – even if they don't get it to spin, they will get an appreciation of the dangers.

Common Mistakes:

Too much bank will result in a spiral rather than a spin.

Ex. 10d – Further spinning - Spin off a failed winch launch

Briefing points:

Aim: To show that the glider can spin from a normal gliding attitude if the speed has previously been slow

TEM: HASSLL, Avoiding terrain, range from airfield, overspeed on recovery

Explain:

 The reasons for practising this and the scenarios involved – not just after a failed winch launch!

Demos:

- Show student NORMAL attitude for recovery speed
- Tell them you will show them that they can be in that attitude but not have a safe speed
- Pitch up as in a winch launch and then lower nose to that attitude. Point out low speed
- Same as point above but turn glider spins
- Coaching:
 - This is such a complicated exercise that the student must be experienced enough to understand it. If you are not recently conversant with this exercise, you MUST re read the Instructor manual. <u>Contents</u>

Ex. 11a – Winch launch – top part

Briefing points:

Aim: To fly the winch launch from the middle to the top.

TEM: Launch failure, stall, spin on the wire Explain:

- Maintaining an appropriate climb angle
- Laying off for drift in cross winds
- Dealing with too much or too little speed
- How and when to release

Demos:

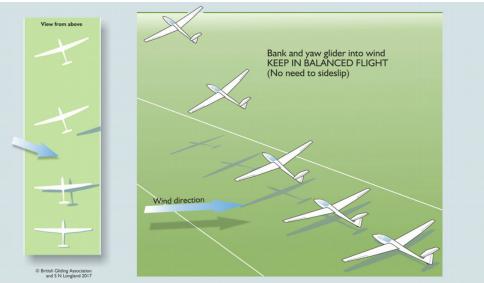
- Patter the launch from approx. half way
- Patter the release.

Coaching:

 When handing over control, ensure student understands stick loads in some gliders

Common Mistakes: Climbing at the wrong angle!

We will not deal with launch failures at this stage. If there is a launch failure, the instructor will take control and deal with it. <u>Contents</u>



WINCH LAUNCH

Height of launch varies and can be 900ft to 3000ft, depending on weather conditions and available length of run

Not to scale

Ex. 11b – Winch launch – ground run, climb

Briefing points:

Aim: To fly the winch launch from the ground TEM: Launch failure, stall, spin on the wire Explain:

- Ground procedures, signalling and equipment
- Separate controls on the ground
- Hand on the release and when to pull it
- Emphasise balanced on main-wheel during ground run

Demos:

 Patter the launch from ground emphasising correct rate of rotation and speed monitoring to full climb if appropriate

Coaching:

 Instructor will take over if glider mishandled even slightly near the ground.
 Common Mistakes:

Rotating into the full climb at an inappropriate rate.

We will not deal with Launch failures at this stage.

Rotation that takes account of speed, height and attitude

Too swift a rotation and too steep an initial climb

Ex. 11c – Winch launch – Failures – straight ahead

Briefing points:

Aim: Deal with a winch launch failure where you can safely land ahead

TEM: Unexpected launch failure, collision, stall

Explain:

- Use of the 'eventualities' check
- The priority of adopting the appropriate attitude and speed after a launch failure
- The decision making process after stabilising an appropriate speed

Demos:

- Patter a 'land ahead launch failure' emphasising:
 - Recovery attitudes
 - o Speed
 - o Decision making

Coaching:

- Student attempts
- Instructor will take over early if failure is mishandled

Common Mistakes:

Allowing the speed to decay after initially gaining sufficient. <u>Contents</u>

CABLE BREAK

Land ahead if it is safe to do so

Ex. 11d – Winch launch – Failures - turn

Briefing points:

Aim: Deal with a winch launch failure where you cannot land safely ahead

TEM: Unexpected launch failure, collision, stall

Explain:

- Use of the 'eventualities' check
- The priority of adopting the appropriate attitude and speed after a launch failure
- The decision making process after stabilising an appropriate speed

Demos:

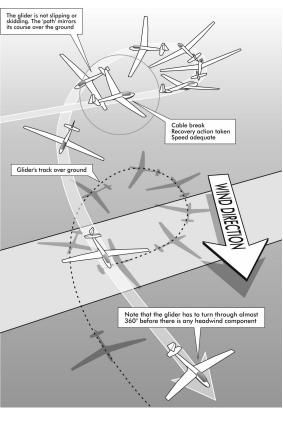
- Patter a 'launch failure involving a turn' emphasising:
 - Recovery attitudes
 - o Speed
 - Yaw string central
 - Decision making

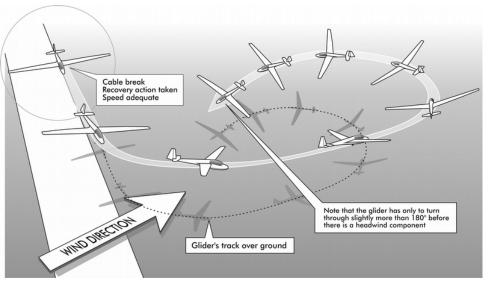
Coaching:

- Student attempts
- Instructor will take over early if failure is mishandled

Common Mistakes:

Allowing the speed to decay after initially gaining sufficient. <u>Contents</u>





Ex. 11e – Winch launch – Failures – very low

Briefing points:

Aim: Deal with a winch launch failure where height / speed is low

TEM: Unexpected launch failure, collision, stall, PIO

Explain:

- Use of the 'eventualities' check
- The priority of adopting the appropriate attitude and speed after a launch failure
- The decision making process after stabilising an appropriate speed

Demos:

- Patter a 'very low launch failure' emphasising:
 - Recovery attitudes
 - o Speed
 - Decision making

Coaching:

- Student DOES NOT ATTEMPT due to the risk of PIO and / or other mishandling issues
- Must be initiated by the winch and not for gusty days. Read the Instructor manual for advice about this potentially risky demonstration <u>Contents</u>

Ex. 11d – Aerotow – above 500'

Briefing points:

Aim: To fly the aerotow from approx. 500' to release

TEM: Launch failure, upsetting the tug Explain:

- Instability of aerotow (despite appearances)
- How to identify correct towing position
- How to stay in station vertically
- How to stay in station laterally

Demos:

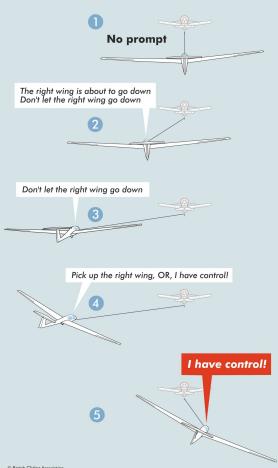
- Correct towing position
- Out of position vertically and low tow recovery to correct
- Out of position laterally recovery to correct

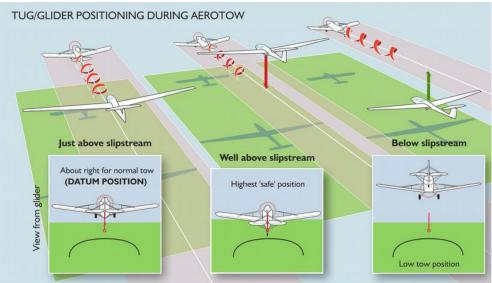
Coaching:

• Keeping wings level with the tug is the key. Common Mistakes:

Inability to keep wings level by looking ahead.

We will not deal with launch failures at this stage.





Ex. 11e – Aerotow – from the ground

Briefing points:

Aim: To fly the aerotow from ground to release

TEM: Launch failure, upsetting the tug, wing drop

Explain:

- Ground procedures and signalling
- Trim position
- Hand on the release and when to pull it
- Separate control use on the ground balance on mainwheel
- Coordinate controls in the air

Demos:

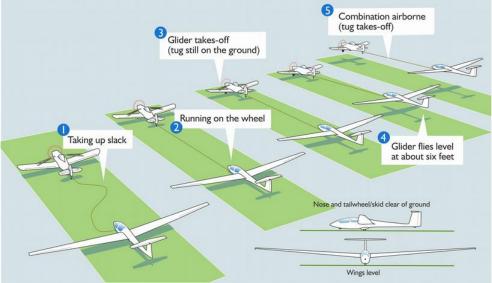
- Patter ground run including initial position of tug as rope goes tight
- Separate and coordinated control uses
- Position of flying glider when tug on ground run.

Coaching:

• Instructor will take over early if low Common Mistakes:

Inability to balance on mainwheel

We will not deal with launch failures at this stage. <u>Contents</u>



Ex. 11f – Aerotow – failures

Briefing points:

Aim: To safely deal with any aerotow failures TEM: collision, stall

Explain:

- Options for landing around your site
- Options on varying runways
- Options with varying wind
- Option to turn back if very safe height and nowhere suitable ahead

Demos:

- Patter during normal tow 'If rope were to break here, I would...'
- Real breaks in MotorGlider ideally Comments:

Practice rope-breaks on real launches behind the tug almost invariably result in turning back. This is not what we want the student to think of first, hence the ideal of teaching using a MG.

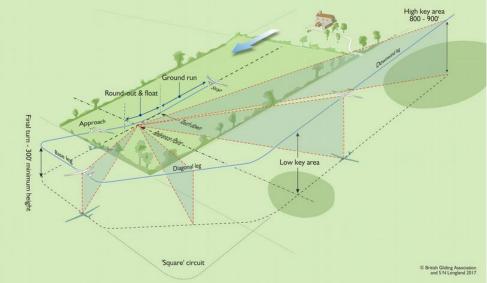
Ex. 12a – Circuits – normal circuit

Briefing points:

Aim: To fly a safe circuit resulting in a final turn at an appropriate height and place TEM: Collision, differing wind

Explain:

- The elements of the circuit and why it's a good idea to fly one (start from final trn)
- Describe planning the circuit before high key, downwind, diagonal, base, final.
- Explain when and why each part flown
- Explain the visual cues used at each stage Demo:
 - Normal circuit, but explaining why we are doing what we are doing.
- Coaching:
 - The circuit is a judgement exercise.
 Students will take a while to use correct visual cues to place themselves correctly.



Ex. 12b - Circuits - out of position or too low

Briefing points:

Aim: To fly safely if you find yourself too low to fly a 'normal' circuit

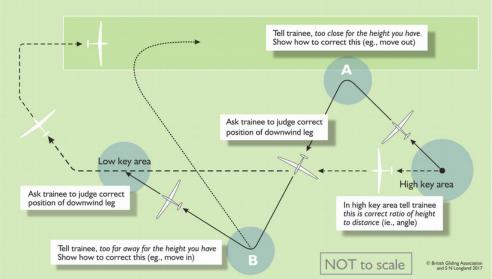
TEM: Low final turns, collision – air or ground Explain:

- The options at your site
- The options in varying wind

Demo:

- Zig Zag Circuit
- Fly to an unusual or low position and demonstrate safe handling of the situation Coaching:
- Student practise
 - Student practises decision making from varying positions

Note – a motorglider is great for this.



Ex. 12c – Approach control – normal approach and under / overshoot

Briefing points:

Aim: To fly a safe approach to ref. point TEM: Stalling, hitting the boundaries, collision

Explain:

- Selection of speed
- Selection and use of reference point
- Approach in the top of the funnel using >half airbrake if possible
- How to recognise and rectify under and overshooting on approach

Demo:

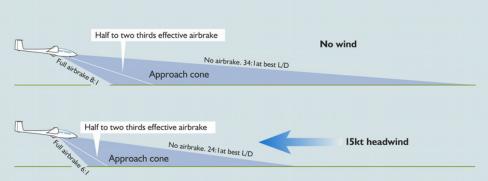
- Co-ordinating airbrakes and elevator whilst maintaining speed (at height)
- Patter a normal approach
- Patter (on another approach) under and overshooting and how to rectify

Coaching:

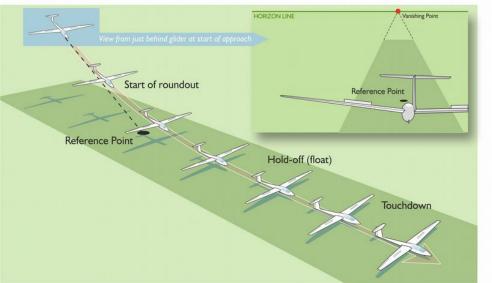
• Student practises the normal approach Common mistakes:

'Pointing' the nose of the glider at the reference point instead of using the correct method.

See the diagram on the next page. Contents



The L/D figures given above are approximate only, and assume a constant airspeed of 50kt, regardless of the airbrake setting. Note: an AS-K21's minimum approach speed with full air brake and at max AUW, is 56kt. 50kt will result in a crash.



Ex. 12d – Landing – normal landing

Briefing points:

Aim: To achieve a fully held off landing

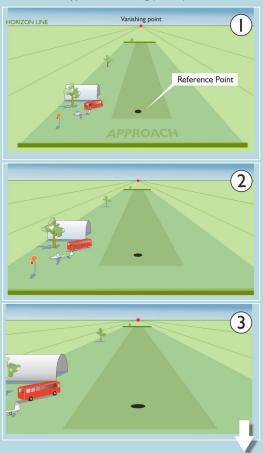
TEM: Hard landing, ground collision

Explain:

- The initial flare how high?
- The hold off
- After touch down
- Control use
- Dealing with balloons and bounces Demo:
 - Patter a landing
- Coaching:
 - Student attempts
 - Instructor will take over early especially near the ground

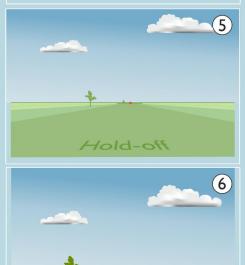
Note – Like circuits, landing is a judgement exercise. Students need to progressively make judgements based on cues that instructors advise students use. It is often a good idea to re-demo if a student is having problems.

Perspective changes during approach and landing (flat site)





Start of roundout



buchdow

ROUNDING OUT (I) Roundout too early and too high Start looking well ahead. Gradually

nwobin

Ground run

Keep glider flying just above the ground

raise the nose

Keep wings level with aileron Steer with rudder

Good landing

ROUNDING OUT (2)



Steep approach followed by sudden/late round-out

Ex. 12e – Landing – crosswinds

Briefing points:

Aim: To achieve a fully held off landing

TEM: Hard landing, ground collision

Explain:

- Mechanics of a crosswind and the crab into wind down the approach
- Kicking off the drift
- Crosswind limits and steering straight on the ground

Demo:

- Crosswind landing with patter
- Coaching:
 - Student practises

See diagram next page.



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Briefing points:

Aim: To fly a safe flight

TEM: Lighter glider effects, collision

Explain:

- Short local airspace quiz
- Check medical or medical declaration in place
- Check all relevant elements of syllabus covered
- Limits of flight

Demo:

• The student will demonstrate, on a previous flight, an example of a forthcoming solo flight with no instructor intervention.

Coaching:

Now the real learning begins – hooray!

Ex. 16 - soaring

Briefing points:

Aim: To keep the glider in the air to extend the fun!

TEM: Collision, stall, spin

Explain:

- Method of soaring taught today
- Soaring with others safely

Demo:

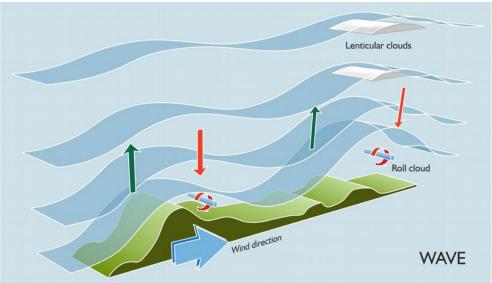
- Correct techniques
- Moving towards the best lift
- Keeping others in sight, especially when thermalling

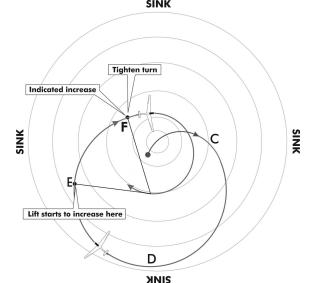
Coaching:

Student pratises

Strongest lift usually along the plane leaning out from near the top of the ridge

Wind direction





Ex. 17 – Type conversion

Briefing points:

Aim: To appreciate the similarities and differences of new type

TEM: Overloading with new information / required techniques

Explain:

- The similarities between existing types and the new type
- The differences
- Locations of controls
- Attitudes and speeds

Demo:

 It might be possible to identify a two seat type with similar differences to demonstrate

Note – Be specific about type conversion briefings and ideally leave the student with a maximum of three things to monitor – perhaps differing attitudes during launch, or pitch changes when the airbrakes are opened. Briefings that go on for hours or the converse ("It's a glider, go fly it") are not acceptable!