SOUTHERN HANG-GLIDING CLUB

WINDSOCK

SUMMER EDITION

JUNE 2021

CONTENTS

“Learn from the mistakes of others. You won’t live long enough to make all of them yourself”

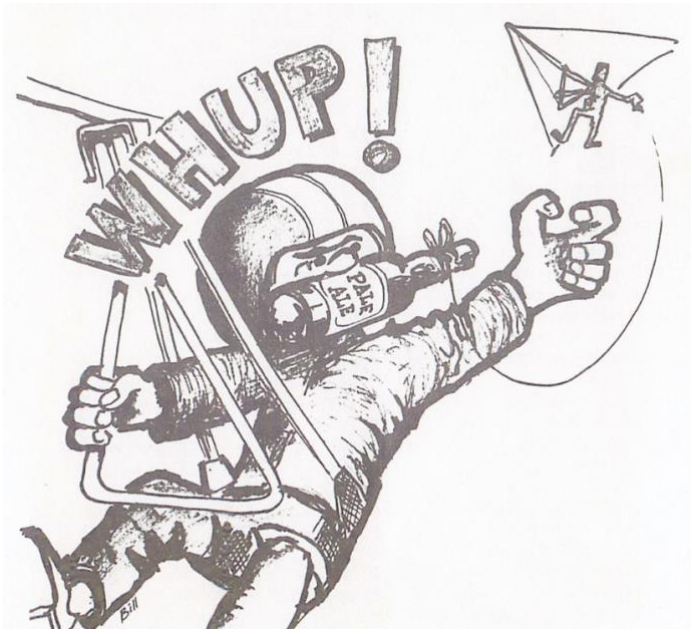
1. Introduction

To all SHGC Club members, new and old, welcome to Windsock summer 2021.

The purpose of Windsock is to inform and entertain with a focus on improving a pilot's knowledge and understanding (at all levels of experience).

Previous editions of Windsock (from the very first edition published in October 1974) are available on the Club's website (www.shgc.org.uk/windsock).

The first edition contained a short article featuring Brian Wood's epic eight-and-a-half-hour HG flight from Rhossili; setting a new record. The flight was particularly memorable as fellow Club member, Tony Beresford, successfully swung Brian's lunch to him, in flight, using a long piece of string. This unorthodox lunch delivery method is recorded, for posterity in the drawing accompanying the article.

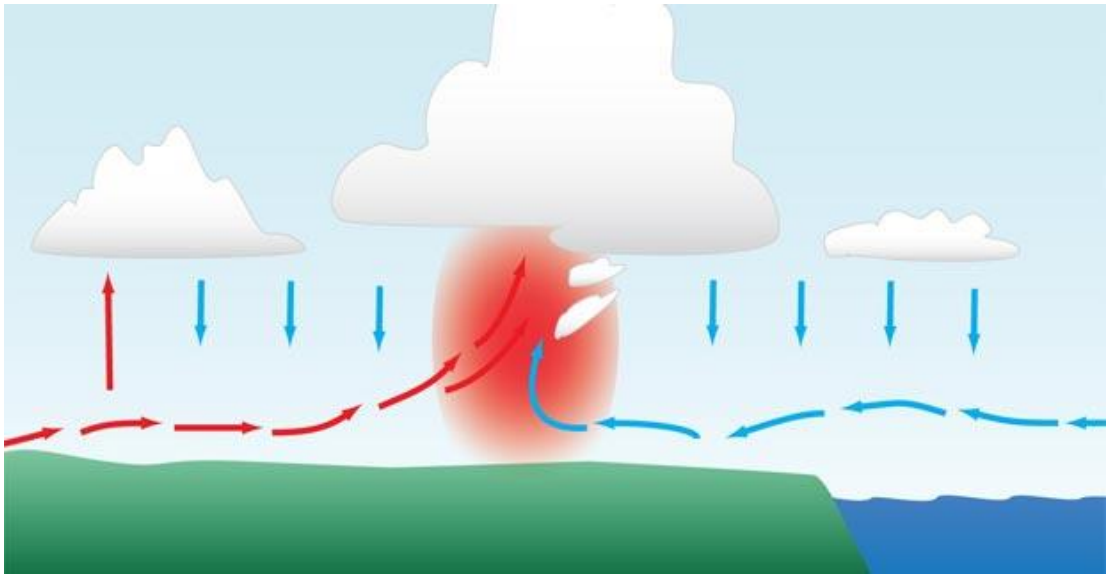


In October 1974, the Club comprised 77 members and this edition expressed concerns about the problems of overcrowding on Southern sites. Some things don't change!

In this edition of Windsock, we include an article (written by Bruce Goldsmith) about **sea breeze convergence** which is, and will remain, a significant feature of our sites. We rehearse the '**Rules of the Air'**; those behaviours that promote good airmanship and improve safety. The role of **the Red Ribbon Club,** which provides an important stepping stone for new, low airtime, or rusty, pilots to gain confidence, experience, and airtime, is reviewed. There is a short review of **the Club's virtual AGM** held in April and the re-appointment of **your Committee.** We have included an article written by Nigel Page exploring the techniques employed to consistently achieve good **top landings**. We include an article written by Nikolay Yolov (from SkyNomads) exploring the dangers arising from three forms of **turbulence; mechanical, thermic, and sheer**. Lastly we conclude with a diary of UK based events taken from Skywings.

Contributions and photos would be welcome for future editions. But, in the meantime, strap in and enjoy the summer 2021 edition of Windsock.

2. Understanding Sea Breeze Convergence: An article written by Bruce Goldsmith (taken from his book '50 ways to fly better').



How the sea breeze convergence works. Fly the red zone, avoid the blue. Illustration: Fifty Ways to Fly Better.

When I first started flying, I remember learning about a strange phenomenon called 'convergence'. In the books, convergence was always discussed as something unusual, as though it only occurred in certain places such as on the coast, or in certain rare conditions.

Yet to my surprise I discovered that convergence appears all over the place: in mountains, flatlands, coastal sites and valleys. And that during an average distance flight you are likely to encounter it at least once if not more. In the Alps I'd say I encounter convergence during at least 50% of all my flights.

What is convergence?

It is basically the meeting of two winds of different directions. Normally, providing that the air masses in each wind direction are different, one will ride up over the other, thus creating lift. However, if both winds are the same in temperature and density, then they will both ride up together, also creating an area of lift. In convergence zones, the thermals are generally more concentrated and are often stronger because the air around is already going up.

Sea-breeze convergence

This is perhaps the most obvious type of convergence. It occurs usually when you have a relatively straight coastline, a prevailing, offshore wind and thermal activity inland. As the land warms up and convection starts, cool, high density air from the sea is drawn inland in a line. At the point where the cool sea air meets the warm inland air, convergence occurs, almost forming a soarable ridge in the sky.

Cause

The sea has a greater heat capacity than land, so the surface of the sea warms up more slowly than the land's. As the temperature of the surface of the land rises, the land heats the air above it by conduction. The warming air expands and becomes less dense, decreasing the pressure over the land near the coast. The air above the sea has a relatively higher pressure, causing air near the coast to flow towards the lower pressure over land. The strength of the sea breeze is directly proportional to the temperature difference between the land and the sea. If a strong offshore wind is present (that is, a wind greater than 8 knots (15 km/h)) and opposing the direction of a possible sea breeze, the sea breeze is not likely to develop.

The Sea Breeze Front

A **sea-breeze front** is a weather front created by a sea breeze, also known as a convergence zone. The cold air from the sea meets the warmer air from the land and creates a boundary like a shallow cold front. When powerful this front creates cumulus clouds, and if the air is humid and unstable, the front can sometimes trigger thunderstorms. If the flow aloft is aligned with the direction of the sea breeze, places experiencing the sea breeze frontal passage will have benign, or fair, weather for the remainder of the day. At the front warm air continues to flow upward and cold air continually moves in to replace it and so the front moves progressively inland. Its speed depends on whether it is assisted or hampered by the prevailing wind, and the strength of the thermal contrast between land and sea. At night, the sea breeze usually changes to a land breeze, due to a reversal of the same mechanisms.

What does it look like?

You can spot a sea-breeze convergence in a number of ways.

First, by the change in wind direction on the ground. The windsock will switch from blowing offshore to onshore in a matter of minutes. The air will also feel cooler.

Secondly, by looking at the clouds. Look for where the cumulus clouds stop in a consistent line, with blue stable air beyond.

Thirdly, if there are clouds in the sea-breeze air the base will be lower than the inland cumulus clouds. There will also often be a vertical curtain of cloud connecting the two cloud-bases. Along the edge of the convergence zone this ‘curtain’ may look like darker, wispy bits of cloud hanging below the flat base of the inland cumulus clouds. If there is a range of hills near the coast expect to find the convergence zone situated over and along the higher ground.

These three indicators can sometimes all appear at once making spotting the convergence zone quite easy, especially if tell-tale clouds are present. On blue thermal days however, both sides of the convergence may be clear blue sky, so the change in wind direction on the ground may be your only sign of the sea breeze.

My experience of flying in these conditions however has taught me that with blue sky sea-breeze convergence, the sea air mass is often a slightly hazier blue than the inland air mass, creating a faint ‘line’ in the air. This is enough – if you look carefully – to tell you where the convergence zone is.

How to exploit it

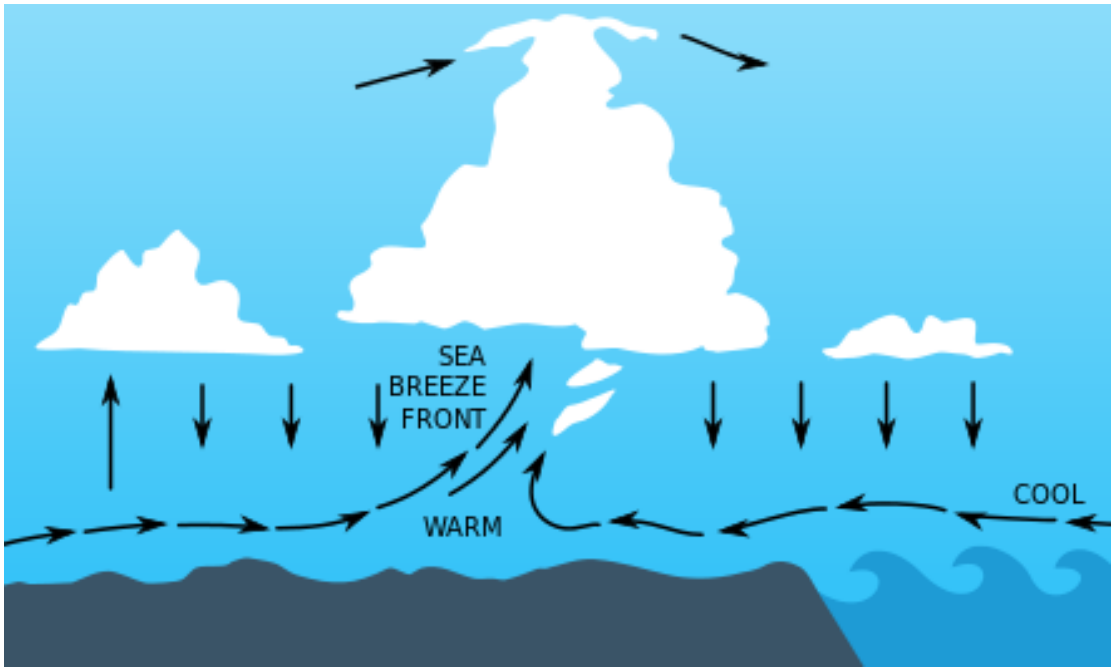
Once you have spotted it the next thing is to use it. The first rule is to fly on the inland side of the sea-breeze convergence line. There are then two techniques of flying the convergence line, depending on the type of lift.

The first method, provided that there is thermal lift in the convergence zone, is to use the thermals in the normal way. The second method, when there is a weak line of ridge lift along the convergence line but no thermals, is to treat the line like a ridge-soarable hill and maintain height by doing beats along the line of convergence.

The most important thing in this case is to pay careful attention to stay on the inland side. It is easy to accidentally slip into the sea air side, in which case you will go down very quickly.

The only way to make distance flights in these conditions is to fly along the convergence line. If you try to fly away from it in either direction, then you either encounter stable air or a headwind. But staying in the convergence line is not always as simple as it sounds.

Often the ‘line’ is not straight, and tends to get pushed inwards in some places and stick close to the coast in others. It depends on the nature of the coastline and the landscape. Sea breezes often flow up small valleys near the coast more easily than over the small hills, so the convergence line is often very irregular.



Schematic cross section through a sea-breeze front. If the air inland is moist, cumulus often marks the front.

3. Rules of the Air (From the SHGC Sites Guide).

1. Avoid a collision at all costs
2. Gliders approaching head-on: Both break right.
3. Gliders approaching head-on while flying a ridge: The pilot with the ridge to their right may be unable to safely move closer to the ridge and so the pilot with the ridge on the left must move further right.
4. Gliders converging - The glider on the right has priority.
5. Overtaking -You may pass on either side but the aircraft being passed has right of way.
6. Landing - A lower aircraft has right of way if they are landing.
7. Thermalling - Unless over 1000ft ATO you must only circle to the right when within 1km of all SHGC sites.
8. Avoid a collision at all costs.
9. Only take off when there is clear airspace available for you and you can do so without disturbance to any other pilot already flying. If you are not sure, then do not fly.

In addition to their numbers, be aware of the variety of aircraft in the air. Hang gliders and paragliders fly at a different range of airspeeds and have very different flying characteristics. Try to be sympathetic to your fellow fliers' needs in this respect.

Take note that collision with a model aircraft can easily prove as dangerous as collision with any other aircraft. Ensure that the airspace you fly in is clear of model aircraft. If passing an area of ridge where aero-models are flying, shout “hello” as you approach to get their attention. The pilot of a model is focused on his aircraft and has little peripheral vision.

Our sites are frequented by an increasing number of very large birds (raptors, ravens and seabirds) A bird-strike could easily prove fatal. Hence you must always fly with caution when near them and must not just expect them to get out of your way.

Horses are easily spooked by passing aircraft, which obviously presents a danger to their riders. It is established practice on all our sites not to over-fly horses, and not to ground-handle, launch or land in their vicinity.

4. Introduction to the 'Red Ribbon Club' (for paraglider pilots)

The Red Ribbon Club is part of the SHGC – effectively a club within a club – and it aims to help new or 'non-current' pilots to gain confidence, regardless of where and when they trained. It's free – but you must have BHPA and SHGC membership.

A recently qualified CP, will have been given basic flying skills and knowledge. But it's only then that a new pilot can start to learn how to fly and gain relevant airtime and experience.

It can suddenly feel a bit daunting, as you realise you are now allowed to fly without the support of an instructor watching over you! Or you may have qualified some time ago but just haven't flown for quite some time, and you would like to get 'current' once again.

But don't fly alone! Club coaches will always be looking out for you, as well as fellow Red Ribbon Club members. Fly where advice and encouragement are always close at hand, until you have the experience to be making confident decisions about where and when to fly for yourself.

You will get a full site briefing, incorporated with a friendly group chat of how best fly given site on that day, weather details, and any other info needed to help you stay safe, and improve your flying skills. It's informal, it's sociable, it's confidence-building..... and it's FREE! (See the SHGC website for more details.)

5. The SHGC AGM (22nd April 2021)

The Committee recently hosted its first 'virtual' AGM which proved popular and many Club members were able to participate.

At this meeting the Treasurer presented the Club's Financial Report & Accounts.

The following Committee members were elected (unopposed), following a vote by the participants (actual and by proxy)..

- Chairman — John Turczak
- Treasurer — Steven Nicholls

- Membership Secretary — Grita Rose-Innes
- Safety — Steve Purdie
- Sites — Dave Lewis
- Chief Coach — Greg Hamerton
- Communications — Catherine Castle
- Aerotow — Steve Marnier
- Web Master — Dave Massie
- Secretary — Chris Aegerter

6. Mastering Top Landings – written by Nigel Page

Nigel Page wrote this article as part of the work undertaken (my many) for the BHPA Pilot Development Scheme. At that time, Nigel found that there was not a consistent definition of what constituted a 'top landing'.. This article constituted his definition and (the opinions expressed are his own) is reproduced in Windsock with his permission. Nigel writes:

Although top landings are no longer a specific requirement for gaining a Club Pilot rating, many schools intend to keep teaching them as part of basic training. However, there is no guarantee, and some CP pilots may find they need either to teach themselves top landings or learn with the assistance of coaches. Such pilots may seem at a disadvantage, but on the plus side they should be able to acquire more experience and develop skills in other aspects of their flying before having to tackle top landings.

Get Help

An understanding of airflow over hills, turbulence and rotor is essential. Make sure you get help and advice from coaches or experienced pilots before first attempting top landings. There are places where only local knowledge or experience will keep you out of trouble.

What exactly Is a Top Landing?

For the purposes of this article let's say that a top landing is a landing in or near an area where the pilot expects to take off from and soar. Our assessment of conditions may well be more important than our skill at controlling our glider. If in doubt, fly away and land at the bottom.

Top Landing Hazards

Most bottom landing fields are fairly flat and reasonably free of obstructions. Top landing areas may have the following hazards.

1. Steep slope.
2. Poor ground surface - Lumpy - Slippery - Holes.
3. Obstructions - Walls - Trees - Bushes - Rocks - Other pilots on the ground - Spectators.
4. Strong wind from venturi effect.
5. Turbulence and rotor.

Fly Carefully - Maintain A Good Airspeed

As we may be flying through turbulent air we must always fly with a good airspeed, perhaps using just enough brake to feel the glider and have good control. We must control any pitching with the brakes. Landing into a strong wind our ground speed will be low, and a big flare with the brakes may lift us off again, possibly going backwards. In a light wind with a high ground speed, we will need to flare fairly hard to slow ourselves down.

- Landing into strong wind - Low ground speed - Minimum (if any) flare.
- Landing into light wind - High ground speed - Flare to slow down.
- Practices like "big ears" and "mushing" to slow down are not a good idea when top landing. Keep that good airspeed.

Overshooting

Unlike bottom landing when top landing we have the possibility of overshooting the landing area and flying away. Again, if we have slowed in order to land, we must restore our airspeed by making sure we let the brakes off enough.

Avoid Steep Turns

Steep turns and large control inputs may make the glider swing and lose more height than we expect. Not a good thing near the ground.

Don't "Push" To Land Upwind of Obstructions

If the wind is at all strong we should not land just upwind of obstructions. If we think we might not land well upwind of a wall or hedge we should do a small "S" turn or carefully use a little brake to let ourselves drift downwind of it. Landing on top of walls or fences, or being blown on to them backwards, is a common cause of accidents.

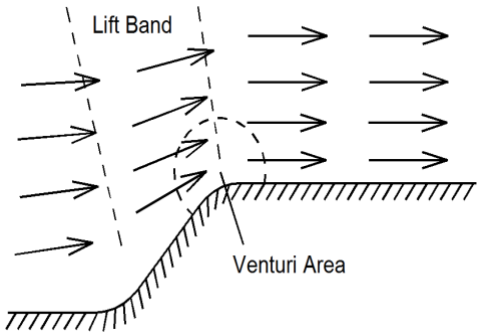
Can We Kill Our Glider?

Once we are on the ground we may have to deflate our glider in a strong wind. Can we do this safely without being dragged? If not, perhaps some (more) ground handling practice in a flat field is required first.

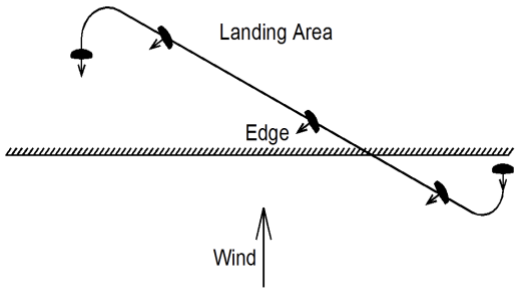
Keep The Landing Area Clear

As with bottom landings, once down we must remain vigilant and move to clear the landing area before packing up so other aircraft, particularly hang- gliders, can land easily.

Let's start our top landings with an easy one. In this case we have an edge with a plateau area behind it so there are no serious worries if we go too far downwind.

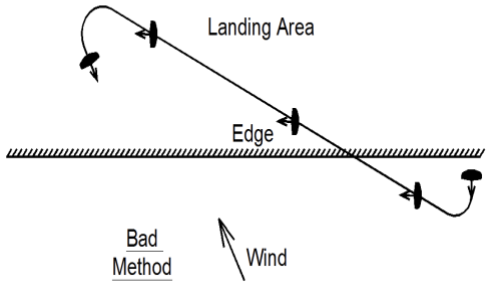


This may not really be a top landing by our earlier definition but we won't worry about that for our first attempts. Our landing area is flat with a nice rounded edge where we launched. We should make sure the wind is not too strong and all we have to do is to get some height in front of the hill, fly diagonally crosswind a bit to drift back and turn upwind to land.

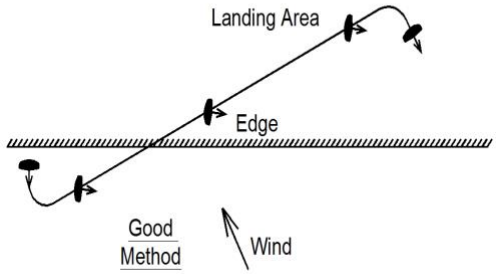


We never actually point downwind at all and in this case we never actually point fully crosswind either. If the wind is really strong we may not have to turn much at all. However strong winds may badly disturb the air flow in our landing area, particularly if there is

wave about. It is crucial to talk to experienced pilots or coaches for our early attempts. If the wind is not square on to the hill we need to be more careful about the direction of our approach.

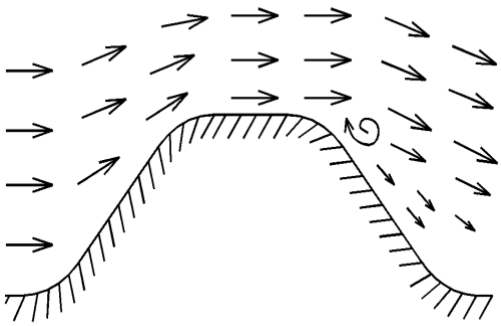


In this ‘bad method’ illustration, the pilot will be flying almost downwind with a high ground speed followed by a “hook turn” of nearly 180 degrees. This requires a lot of skill with not much room for error. We can do much better.

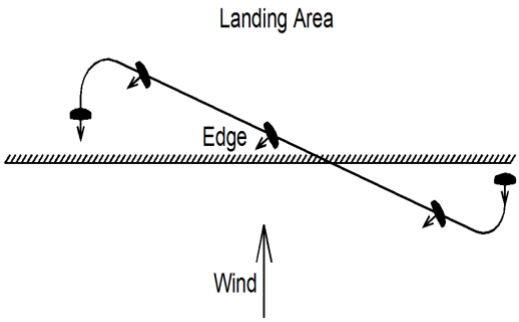


In the good method drawing, the pilot now has a much lower ground speed and gentler final turn. Much easier and safer. Always try to top land in the “slow beat” direction.

We now have a method for landing on a narrower flat-topped ridge as long as we are careful not to go too far downwind.

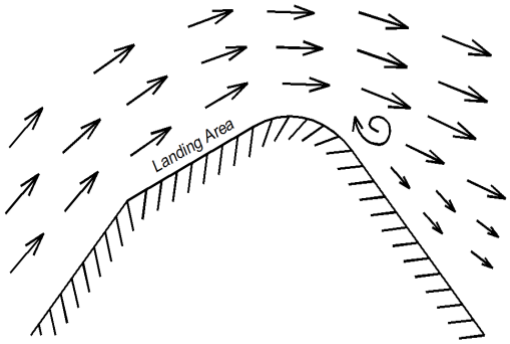


We can also practice landing nearer the edge and using less of the available flat area.



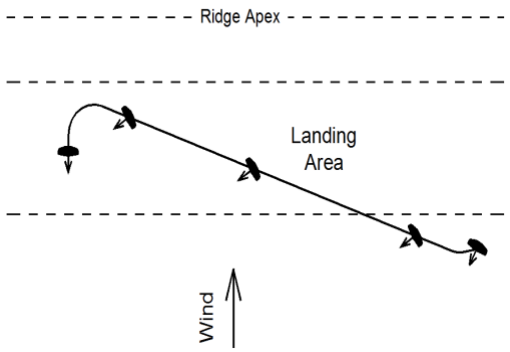
This will help us when we come to land where there is no flat area, but we will have to be more careful of potential turbulence or rotor from the edge itself. Remember to keep those hands high to maintain a good airspeed.

Now let's look at a sloping landing area with downwind hazards.

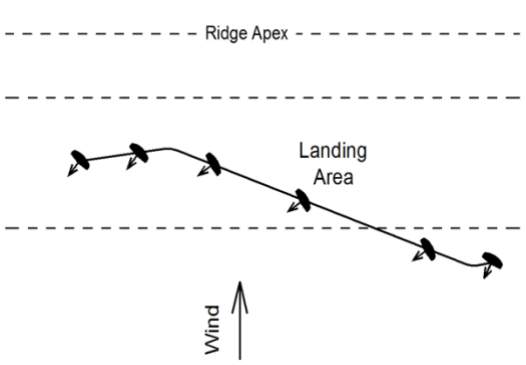


On this hill we have a limited landing area which is sloping, in lift, and from which other pilots may be launching. The whole landing and ridge top (apex) area may be subject to increased wind strength due to venturi. With the downwind side of the hill being steep being blown backwards will be very dangerous indeed.

The question is not so much how to make a landing as whether it is safe to attempt one. Our approach for a top landing will be similar to that for the flat-topped hill, but we probably want to keep in front of the ridge apex.



If it is too lifty and we cannot get down we will have to fly away, lose some height and try again. We may also have difficulty getting down because of the slope of the landing area. In this case we will have to do a crosswind slope landing as we might on the face of a hill.



This may need a bit of practice to get right so we must be prepared to fly away if it looks wrong. Again, if the wind direction is not square to the hill, we must make sure we land in the “slow beat” direction.

If it is very sinky, perhaps between two lift cycles, we may find ourselves “dumped” on the hill, which can be very unpleasant and is a common cause of accidents. Be ready, but if there is significant sink about it is probably safer to fly away from the hill and bottom land.

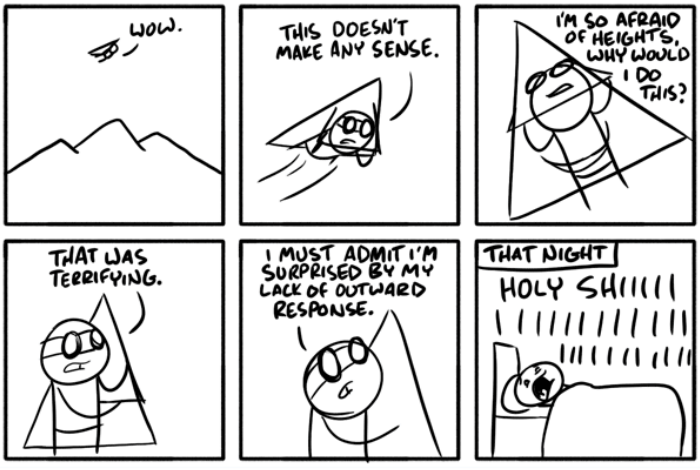
Top landings are not so difficult, but we need to be more careful assessing conditions than for bottom landings. Let's recap our assessment looking at particular issues of strong and light winds.

Strong Wind

- How strong do we think the wind is? Are pilots having difficulty penetrating whilst launching or landing?
- Is there a large enough clear area to land safely? Obstructions downwind of our intended landing area may be a greater hazard than those upwind of it. Will we be able to deflate our wing OK?
- We may be able to test the wind by making a pass in front of the landing area, although this may not be appreciated by pilots on the ground.
- If in doubt, don't attempt a landing. Either keep flying or bottom land.

Light Wind - Watch for Crowding

If the wind is light we may wish to land because the lift is decreasing, perhaps because a thermal cycle is ending. On a busy hill this can lead to all sorts of problems. Other pilots will be trying to top land for the same reason. Quite possibly pilots on the ground, having waited for the wind to drop a bit, will not realise it is becoming difficult to soar and be trying to launch. We need to be extra careful to avoid conflicts with other pilots. If we are heading for a crowded area we must turn away and bottom land if necessary. Do not fly into an area which is becoming crowded.



7. Mechanical, Sheer, & Thermic Turbulence – Written by Nikolay Yolov (SkyNomads Paragliding – Bulgaria). The opinions expressed are his own.

When an isolated airflow moves slowly, there is no exchange within its layers and we call it **laminar flow**. However, if its speed is increased, beyond certain value, the flow becomes turbulent by itself. **Turbulent flow** means chaotic movements of air particles in random directions. The switch from laminar to turbulent depends on the flow properties (*dimensions, viscosity*) and roughness of neighboring surfaces. The rising (*cigarette*) smoke starts laminar, accelerates upward and once reaches a critical speed for the given conditions, it becomes turbulent by itself.

Practically, winds of more than 5-6 m/s are considered to be turbulent and the intensity of turbulence increases with the square of wind speed (W2).

Flying in turbulence is dangerous because wing stops working like a wing if there is no smooth airflow around it. Flying the soft paragliders in turbulence means experiencing stalls, spins, collapses, sudden lift/sink/turn, not reaching safe landing because of height loss. It's unpleasant even for experienced pilots. Even birds lose their elegant style in turbulence.

Despite its chaotic nature in the invisible air, turbulence can be indirectly observed, studied, predicted and avoided.

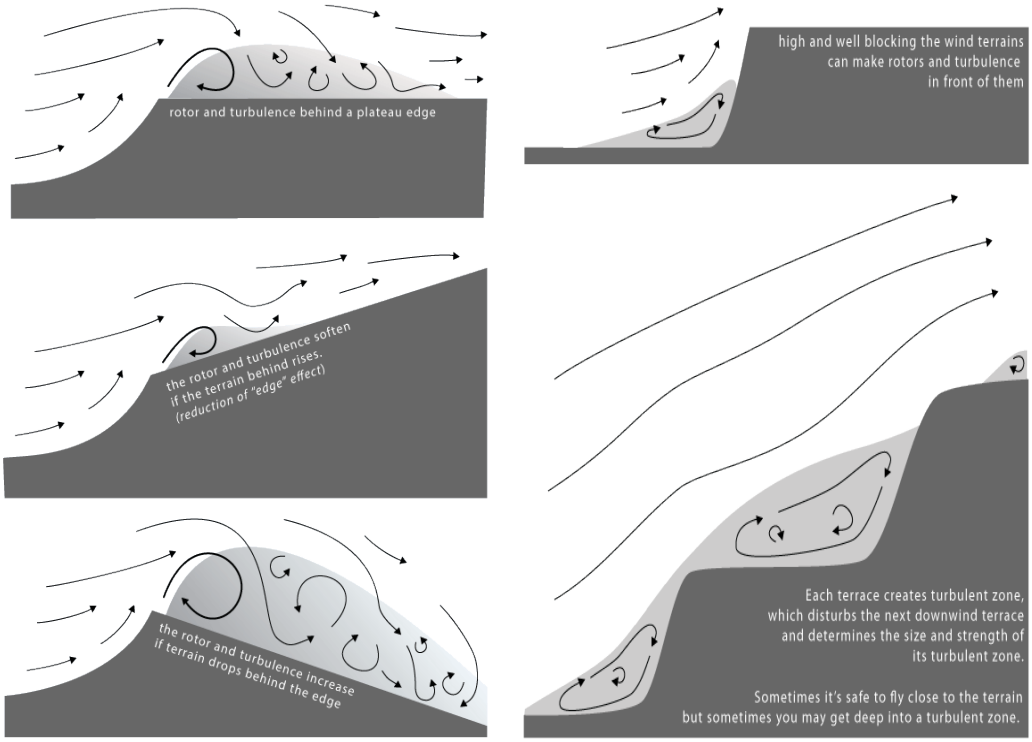
The classic case is the **mechanical turbulence** caused by wind's interaction with solid objects (trees, buildings, terrain). The smoother shaped and smaller size objects create less turbulence. Objects, which block wind well, create bigger turbulence behind.

The acceleration of the flow around the **turbulence source** creates suction zones, which promote the creation of big **vortexes**. Their shape, dimensions and intensity depend on the object shape (profile), wind strength and air mass properties. Circular motion conserves energy and we can say that vortexes live their own life. In steady winds and stable air, some object profiles can create "attached" to them long lasting vortexes behind caller **rotors**. If wind drops, vortex loses momentum. If wind increases, the gust can literally push the vortex downwind where it dissipates into promoting and suppressing each other smaller and smaller vortexes. Still isolated vortexes can travel surprisingly far, since their initial circular motion helps preserve momentum.

Both stationary (rotors) and travelling vortexes initiate smaller rotations next to them and the newly formed free air vortexes initiate more neighboring rotations. As a result, the turbulence zone is expanding behind the obstacle but its intensity decreases further away from the turbulent source.

As a rule of thumb, the **turbulent zone** can extend as much as seven times the height of the obstacle but again it all depends on object's shape, air mass properties and square of wind speed. Vwind2 means if wind speed doubles, the energy of turbulence will quadruple.

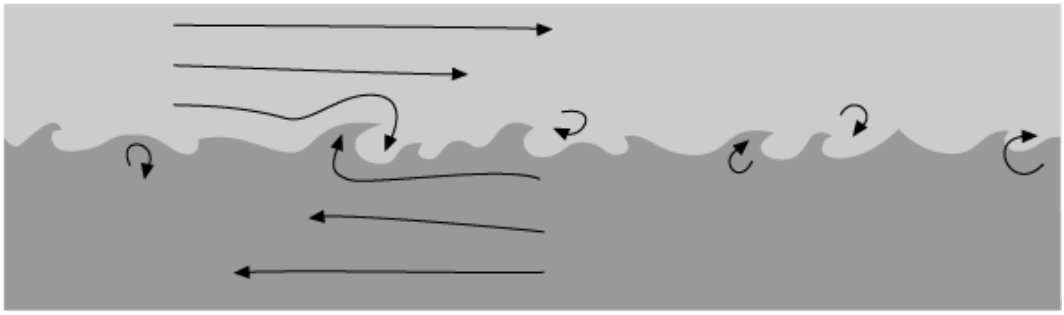
A classic case is the rotor and turbulence behind the edge of a plateau or a terrace. There are many take offs at the edge of a plateau where pilots have problems inflating their wing inside the rotor and raise it in the undisturbed flow above. Top landings there should be far behind the edge. The terrain behind can increase or decrease the "edge effect".



A high and well blocking the wind vertical slope can even create rotor and turbulence in front of them. It's not so energetic like the turbulence behind the edges and pilots sometimes call it "dead air" because they may fall in parachutal stall, but collapses and surprising back wind may also occur.

Multiple terraces (edges) create multiple turbulent zones, which disturb the next one downwind because even slight change of wind strength and direction decide the role of the next edge and resultant intensity of its turbulent zone. Often experienced pilots fly safe close to the terrain, but unlike beginners they "read" well the terrain irregularities, resultant turbulent zones and possible variations.

When an air mass layer is moving in relative to another neighboring layer, then **shear turbulence** occurs around the bordering surfaces. The shear turbulence intensity depends on the relative movement and different properties of air masses (density, viscosity, temperature…).

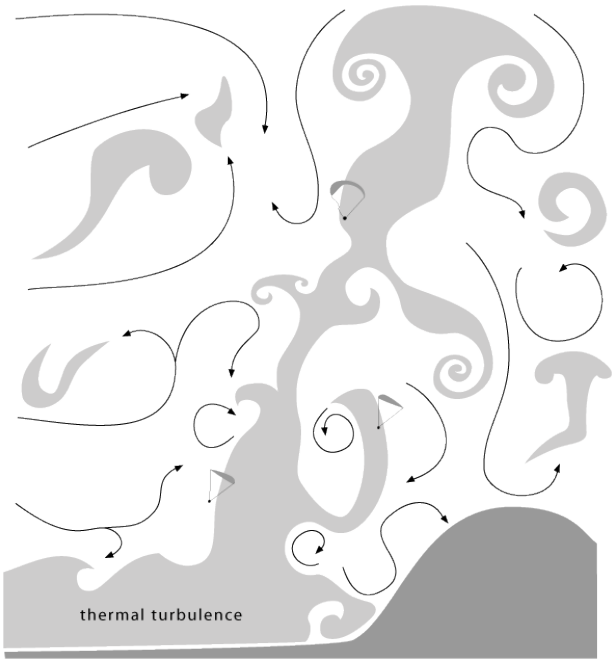


Shear turbulence between two layers moving with different speeds and directions

Classic example is when cool sea breeze wind enters inland under warmer air above. Frontal surfaces also have shear turbulence. Even thermals' surfaces create shear turbulence when rising through the surrounding cooler air.

Early in the morning, later in the evening, in autumn or in winter and at seacoast we may experience mainly mechanical and shear turbulence. In the middle of the day, especially in summer and in mountains, the sun's heated surfaces create warm light thermic volumes of air, which rise throughout cooler and denser surrounding air.

Thermals can raise us to heaven, but can also throw us to hell. Apart from the shear turbulence at the edges of rising thermals, thermals themselves are source of **thermal turbulence** because these thousands of tons of air interact with surrounding air and cause chaotic vortexes and turbulence inside and outside them.



Some signs of thermic turbulence are

- Gusty and variable wind on the ground. Especially when min and max winds are more than 50% from the average wind speed.
- It's more difficult to inflate and control your glider on take-off in turbulent conditions.
- Energetic pitch, roll, course change, collapses and stalls of paragliders in the air. Even birds lose their elegant flying style in turbulence.
- Dust devils and other wind indicators (as tree leaves, flags, smoke, water surface) visualizing vortexes and turbulence.

If you enter turbulent zone

Help the paraglider recover quicker by keeping it above your head (hands up if a gust pushes the wing backward; pull the brakes quickly to stop any dives forward and then quickly release them to let the wing regain airspeed.

Exit the turbulent zone the shortest way plus slightly downwind (this increases your glide ratio). If possible, chose a direction which will increase your height above the terrain to give more space and time for recovery from collapses, cravats, stalls, spins;

Maintaining your airspeed is more important than your course (by pulling too much brakes). Good airspeed means high pressure inside the canopy and more resistance against collapses and stalls.

8. Diary (UK based events)

26/ 27 June 2021: X-Lakes Challenge (PG) www.x-lakes.uk
26 July/ 3 Aug: British Open Series (HG) round one www.hgcomps.uk
8/ 11 July: British Open PPM Championships www.ppgcomps.co.uk
16/ 18 July: Lakes Charity Classic (PG) www.cumbriasoaringclub.co.uk
24/ 25 July: PG Accuracy Nationals www.bhpa-accuracy.org.uk
28/ 30 August: UK PG Classic Accuracy Nationals www.bhpa-accuracy.org.uk

9. Last words…

A man was walking down the street when he was accosted by a particularly dirty and shabby-looking homeless man who asked him for some money for dinner. The man took out his wallet, extracted fifty pounds and asked,
"If I give you this money, will you buy booze with it instead of dinner?"
"No, I had to stop drinking years ago," the homeless man replied.
"Will you spend this on paragliding instead of food?" the man asked.
"Are you NUTS!" replied the homeless man. "I haven't flown paragliders in 10 years!"
"Well," said the man, "I'm not going to give you money. Instead, I'm going to take you home for a hot shower and a terrific dinner cooked by my wife."
The homeless man was astounded. "Won't your wife be angry with you for doing that?
The man replied, "That's okay. It's important for her to see what a man looks like after he has given up drinking and paragliding."

And one for the hangies…

I always enjoy talking to spectators on launch or in an LZ. In the early days, lots of folks who had never seen anyone "jump" or "fly a kite" simply did not know what to think and looked on like it was a daredevil circus stunt!. In the late 70's I was standing on a cliff, ready to take-off with an Electra Flyer 205 Floater and several pilots had just landed in the primary LZ. And this older lady who was watching right off my wingtip said to me "I see them all down in that same field, can you guide those things?" And as serious as a heart attack I replied "No, we have a big magnet buried down there in that field and when we jump off it draws this metal frame to that spot. And her reply was "well that makes sense, I thought it was something like that."