



TM02

Speed Wing Technical Manual

Version 1.1 31/3/2022

The NZHGPA has a suite of Technical Manuals.

These documents can be used as:

- Minimum Acceptable Standards
- Study material for students and other pilots
- Guidance on rules and compliance

List of Amendments:

30/3/2022: Version 1.1 - Section on 'High speed swoop landings' has been reviewed and updated and section on 'recovery arc' was added.

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About this manual

This is a working manual which may have amendments and updates from time to time. Make sure you are reading the latest version found on the NZHGPA website. It is related only to speed wing flying for the introduction of a speed wing rating by the NZHGPA and therefore does not include information covered in your PG2 training. .

This manual is designed to support your learning under qualified instruction. It is not a set of instructions for teaching yourself how to fly your speed wing.

This is a New Zealand guide only so if you plan to fly in another country, ensure you get advice for licensing and flying requirements in that country.

Definitions

Speed wing

means a paraglider which is:

1. Designated by the manufacturer as a speed wing or speed flying wing or,
2. any wing listed in the NZHGPA speed wing data list as a speed wing or,
3. any other paraglider type wing of less than 18 m² flat area flown at a wing loading of 7kg/m² or more.

Speedflying

A flight with a speed wing.

Speedriding

Ski launching a speed wing on snow with the intention of maneuvering the wing while maintaining ski contact with the snow for a significant proportion of the flight.

About the Speed Wing Rating

The Speed Wing rating is an aircraft type rating which is an extension to the PG2 paraglider certificate. PG2 and other prerequisites listed on OPMF81 must be completed prior to starting speedflying training.

Having a good progression into speedflying is what will keep you safer and allow you to enjoy speedflying for a long time.

Speed Wing Coach (SWC) Rating

A SWC is a high level speedflying pilot endorsed by the association to teach speedflying to a pilot who has already completed a PG2.

Requirements to become a SWC are:

1. Current First aid.
2. Speed wing pilot rating.
3. Be supported by a Paragliding Instructor and two other pilots all with the Speed wing rating.
4. Apply with a written submission of your background and experience in speed wing flying.

Equipment

Wing types

Flying Different Speed Wings

The range of speedwings available today is very diverse. Some wings although they may look the same and are even the same size by m2 they can fly very differently. Some speedwings are designed more specifically around speedriding on ski's, these wings can still be fine to foot launch but will often require a higher level of skill and a much more committed launch than a speedwing that is designed more specifically for speed flying. These wings don't generally limit you totally to one discipline however its important to understand the differences in wings and how that's going to affect how you can fly them.

There is a good chance that you will over time have the opportunity to fly a range of different speed wings, presumably belonging to someone else. While this will be tempting, it is best to proceed with caution. Read all available material on the handling characteristics of the wing, and get a good brief from a pilot experienced on that wing. It would be even better if that pilot was also experienced on your current wing, so the differences between the two wings can be highlighted.

Spending some time ground handling the wing before attempting a flight is prudent. It is a good idea to fly at a familiar site. A progressive approach when learning a new wing is always a good policy. Remember that over-controlling any wing may have unexpected results so take a cautious approach and give yourself extra margins.

Risers

You should never use your A's or front risers to manipulate the glider in flight.

Speedwings and paragliders fly with a much smaller angle of attack in comparison to a skydiving specific canopy. This makes them much more prone to frontal collapse and depending on the performance of the wing and severity of the collapse it is likely to take a lot of expertise and altitude to be able to recover the wing.

Riser Configurations

Some speed wings have more risers than others, they could have 2,3 or even 4 risers. The difference in riser numbers can change launch characteristics and how it responds to rear riser steering.

Rear riser steering/control: Why and How

It is common practice to use rear risers for directional control in flight. This is a skill that should be built up to, you must understand the limitations and advantages of control it gives. Extra caution should be taken when landing using your rear risers.

Never hold your risers while flying

It is bad practice to hold your whole riser while flying, as this tends to reduce your response time to control the glider and removes any feeling from brake pressure.

Trimmers

Trimmers are the sliding adjustment which is generally found on your rear risers, often referred to as your speed system. On a paraglider you can use a speedbar to trim your glider for increased airspeed, while on skydiving canopies you have no such system available to you and the only way you can speed up your airspeed in straight flight is by pulling down on your A risers. Pulling your A risers is extremely dangerous on a speed wing and should never be attempted.

In this guide when referring to trimmers we talk about them being in or out:

- IN: A high angle of attack which is the wing flying at trim speed. Its slowest speed without brake input.
- OUT: A Reduced angle of attack, Steeper Angle, Reduced glide. Its fastest speed without diving the wing.

Trimmers can be adjusted safely in flight, However this should be practiced with plenty of height and margin for error, it's also very important to be familiar with the trimmers and their usage for your particular speed wing.

When adjusting your trimmers you should be symmetrical and controlled. It can be a good idea to visually check your trimmer's positions after every adjustment. Remember they are not an ON/OFF setting, they are a sliding scale you can work through the trimmer range incrementally as you build your experience levels up on your speedwing.

Glider performance using trimmers

See also, 'Glide Ratio' below.

Flying with your trimmers IN is the best glide. You should be cautious when letting your trimmers OUT for the first time as they will change the glide and make it steeper as well as change the flight characteristics of the glider. You will lose a lot more height in a turn and it will greatly change your dive recovery arc. What this means is when you make a turn the glider will continue descending in a dive for longer before it rounds itself out unless you put in input to pull the glider up and control the dive.

Trimmers on the front vs the rear

Most current speed wings have the trimmers on the Rear Risers, however some have them on the Front Risers.

Some older models of speedwings have trimmers on the A risers, This configuration requires special consideration as adjusting them during flight becomes more challenging due to the higher loading of the A risers compared to the rear risers. Also adjusting them aggressively could induce a frontal collapse or asymmetric collapse.

Wing Loading

All gliders are designed for a certain Wing loading range, which is usually stated by the manufacturers as a weight range for each size of wing. Most speed wings have quite a large weight range e.g Swing Mirage RS 13.5m has a weight range of 60-120Kg or 4.4 - 8.9 kg/m².

The flying characteristics change dramatically with a change in wing loading so it is important to understand where you are within the range of the wing. If you are flying the wing at the very bottom of the weight range, it's trim speed at that loading will be the slowest it's designed for, the glider will have less internal pressure and lower brake pressure which makes it more susceptible to collapse can mean you will be flying

closer to the stall speed. However the lower energy means its responses will be slower and less reactive making it easier and safer in many ways to fly. When downsizing speedwings (increasing wing loading) expect big differences in how the wings perform. You will generally experience a much more reactive wing that dives a lot faster and easier and has less natural recovery from a diving turn. The more loaded a wing is the more active piloting it requires.

Glide Ratio

Due to the lower aspect ratio and higher drag of a speedwing we have less glide performance than a standard paraglider. However it is very important to note that the glide performance of different speedwings can vary greatly.

An example of this is say you fly a site on your 11m Swing Mirage but somebody else has an 11m Swing Spitfire; they are the same colour and same size so how different could it be? The answer is it could be so different that one of you can make it to the landing field and the other can't.

Always remember that letting your trimmers out will reduce your glide ratio and generally also reduce your glide over the ground.

A wing will fly its best glide ratio with hands up (zero brake pressure) so if you fly with brake on you will reduce your glide and reduce the wings performance.

Harnesses

Most speedflying harnesses have no back protection and you must be aware of the increased risk of injury from a hard landing. It's recommended to use harnesses that are specifically designed for speedflying, some split leg paraglider harnesses can be used but if you're not sure seek advice.

Seatboard Harness

Seat board harnesses should not be used with speedwings due to the excessive weight shift capabilities (for small wings) and the reduced ability to run freely.

Helmets and eye protection

Wearing a helmet is a legal requirement in NZ as specified under the Operating Procedures Manual (OPM). A full face helmet can add extra protection, however it is the pilot's choice as to which helmet you use. Eye protection (sunglasses, helmet visor or goggles) is recommended for the increased airspeed in flight and also for protection in case of an unplanned landing in trees or bushes.

Cameras

When filming your flight no matter if the camera is fitted to you or if somebody is filming you, be aware of this as being a hazard and pay extra attention to your flying. Stick to what you know and avoid changing your flight plan just for that 'shot'. If you are wearing a camera on you, make sure you are aware of the snag hazard it provides and helmet mounts should be avoided due to the effect on impact protection.

Launching

Pre flight Check:

1. Helmet
2. Harness
3. "TRIMMERS!" lines and glider
4. wind speed and direction
5. Airspace

Launching a speedwing

Due to the size and weight of a speedwing they are easier to get above your head than a paraglider.

You can both 'forward' or 'Reverse' launch them. Often with a light breeze of 5-10kph it can be simple to launch them without using A risers but this does depend on the wing you are flying.

Using A risers to inflate the glider can be a valuable tool in light conditions as the sooner you can establish the glider above you the better. You should be able to get the wing above you in about 3 steps. This isn't an expectation but something that can be practiced during ground handling. **TIP:** Generally, slowing down will get you there. Once the glider is above you, you can accelerate to build the airspeed for takeoff. Running like a bull out of the gate can leave you committed to a takeoff without any idea of where the wing is. This has been proven to be a fatal mistake.

Before takeoff

Build your 'mental weather picture', piece by piece. Just like you would have learnt in your PG2 you can never be too observant of weather conditions. You should never be under the impression that your speed wing is immune to strong wind and/or turbulence. Your flight plan should be dictated by the conditions.

Choosing a Launch

Deciding where is a good place to launch takes experience and skill. It's important to start with something that matches your skill level and the wing that you are flying. Get local advice and stick to commonly used sites to begin with. Never underestimate how much the conditions can influence the degree of difficulty when it comes to a launch.

There should never be doubt when it comes to launches and launching, always have the ability to stop the wing between the inflation and giving full commitment to a launch. Having this ability depends hugely on the pilot's skill and the launch (steepness and length).

The perfect Launch

A perfect launch is one that starts with a nice easy slope for inflation and wing check then progressively gets steeper with no terrain hazards below the launch such as roads, rocks, trees, powerlines etc. The launch should allow for clean airflow and an easy run.

Taking off is a progression that moves through the inflation phase, checking the wing is flyable and then the transfer of ground speed to airspeed until your wing lifts you from the ground. Be sure not to force your body to leave the ground before the wing has enough airspeed to support you.

Cliff launches

When referring to a cliff launch we're talking about flat ground leading to a near vertical face with a sharp transition. Obviously launches can be somewhere between a cliff and a nice progressive launch slope. It's important to understand where the launches you choose fit on this scale.

Should be avoided and reserved for experts. Some coastal sites make a cliff launch more possible, Know Your Limits: If there is any doubt, there is no doubt! Don't launch!

When launching anywhere that's not a progressive slope it takes a high level of skills and experience. Due to the potential sudden loading of the canopy you must have good glider control throughout the launch. Most importantly making sure the glider is in consistent airflow before takeoff.

Diagrams A and B below show a visual representation of air flow over a cliff edge vs. a progressive launch:

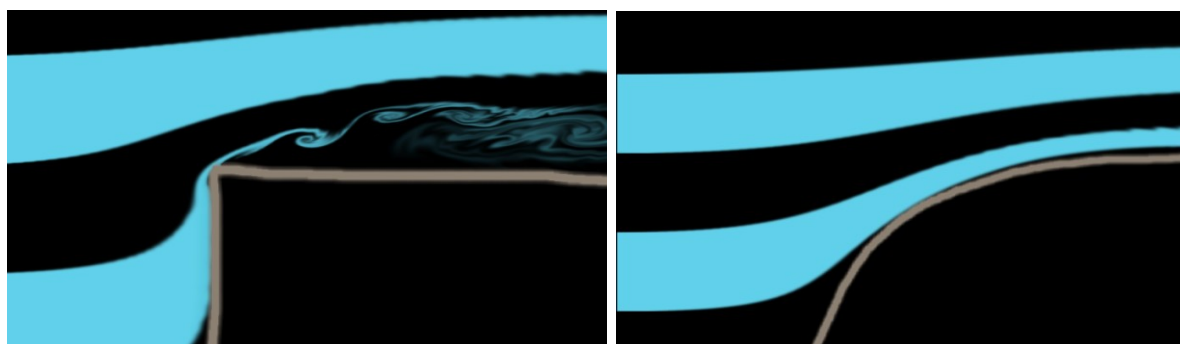


Diagram a: Airflow over cliff edge

Diagram b: airflow over progressive launch

Launch Technique

The "Torpedo Launch position" is the position which is recommended when foot launching a speed wing. Something that can be easily practiced in a field. Leaning forward with your hands back and up this should encourage you to take long strides whilst managing your brake handles in a way that unwanted brake is not applied throughout the launch.

Forward Launching

There are two main ways of forward launching a speedwing. **One**: using your "A" risers to inflate the glider before transitioning into "Torpedo position". **Two**: Holding just your brakes with your risers laid over your forearms. Both launch techniques have a time and a place.

Reverse Launching

Information on reverse launching?

Know Your Limits: If there is any doubt, there is no doubt! Don't launch!

Transitioning into your harness should be done in a controlled smooth manner and not necessarily straight after launching, you should never 'jump' into your harness. Having your legs down and being prepared to use them could prevent you from an accident or severe injury. Your legs are much better shock absorbers than your spine so be prepared to use them.

In Flight

Having a good progression into speedwing flying is what will keep you safer and allow you to enjoy speedwing flying for a long time.

Choosing a Safe Line

During a mountain descent, You can lose altitude during a flight but you can't generally gain it so it's very important to make sure you have chosen a line that offers options and glide to a safe landing.

Having margin for error is what will keep you flying for a long time, the wing you're flying, conditions, currency and skill all have to be considered, the more you fly the better you will get, thus opening up more options with your flying. Because he or she did it does that mean it's good for you??? only you can answer that.

Weight Shifting

In flight weight shift turns is one of the first skills you should practice. This is an efficient way of steering since there is less drag than using the brakes to turn. Then moving onto combining weight shift and brakes, by weight shifting in the direction of the turn. The tighter your chest strap is the less effective your weight shift will be. Often a glider will have a recommended carabiner distance to set your chest strap at, but it's up to the pilot how he sets his harness. The wider the carabiners are apart the more weight shift you will get out of the harness.

Note: some harnesses have lower attachment points than others and this will also affect the weight shift characteristics of a harness.

How to weight shift

In a split leg harness, which is what most people choose to fly with, you should lift your outside leg for the turn you plan to make. e.g. if you want to turn right look right then raise your left leg slightly whilst pushing down your right leg. Scissoring your legs like this is much more effective than just leaning your upper body. Remember to take it easy and build up your weight shifting progressively.

Avoid Over-Controlling

Speed wings can be very responsive. Especially when first learning to fly speedwings be very careful of making large unnecessary inputs. Aggressive turns can quickly get you into trouble and the amount of altitude loss can be unexpected and extremely dangerous.

Some pilots have shown a tendency to continually 'pump' the toggles. Regardless of whether this unnecessary pumping action is done consciously or unconsciously, the wing cannot be forced to fly more efficiently by pumping the toggles. This action will continually disrupt the airflow over the upper skin, which in turn will induce more drag, not less. And it is easier to judge your projected flight path when you are carving a smooth line, rather than a ragged line with a surging wing.

Active Flying

Whilst a speedwing is more loaded than a paraglider, it also has the potential to require the same active flying. However the main difference is that to actively fly your speed wing, your reflexes need to be twice as fast.

Speed to Fly

All PG/SF wings have a set trim speed. This speed is only changed by the loading that the wing is being flown at e.g. If you're at the top of the weight range the wing will fly faster through the air than if you're at the bottom of the weight range. To achieve trim speed your hands should be up with no pressure in the brakes and your trimmers should be in (refer to [trimmers](#) section).

Flying at trim speed with just enough pressure on the brakes to feel the glider is your safest mode of flight. This will dampen the glider's reactions to active moving air, and means as you come into moving air and the glider goes back you can release the brakes to reduce the movement of the glider or if it dives forward you can apply more brake and slow the glider from diving.

However speed is your friend when it comes to the control of direction and flare authority. When you are flying with faster air speed you have a much bigger brake range available to you at all stages of your flight before you get to your stall point e.g. if you come into landing carrying 20% brake you have reduced your glide ratio and when it comes to flaring you will have reduced your ability to push through the brakes for a nice controlled landing.

Full Speed Trimmers off. This is a great aspect of speed wings as it allows you to land with that nice long swoop or fly that steeper line. But it's important to remember that it also reduces your angle of attack. Reducing your angle of attack makes you more susceptible to asymmetric or frontal collapse. This is why if you're in turbulent air for any reason it's generally a bad idea to let your trimmers off (to fly "faster"). It's a myth that flying faster through rough air is safer.

The need for speed. It is important to note the other end of the speed topic. It's still possible to stall or spin a speed wing so for this reason you should be very careful of using too much brake, especially suddenly or aggressively. This is especially important for people using speedwings for soaring or for people coming into the sport from a skydiving/base background. Speedwings are much more sensitive to brake input than the canopies used for skydiving and especially base. If you toggle pull a speedwing like a skydiving or base canopy you could quickly become a short term speedflyer.

Recovery Arc

The recovery arc is the term given to a canopy's flight after an input. Whenever you pull a toggle the canopy turns but it dives a little too. The recovery arc is the path of the canopy during that dive to recovery to normal flight. A lot of people tend to make recovery arc refer to an amount of time instead of a path and distance in the sky. This is mostly referred to when talking about swooping landings when starting with hook turns but is also in relation to ANY dive or input to a canopy from any altitude.

A good way to understand your recovery arc with a Speedwing is to practice well above terrain with a good set up to allow you to gain some reference to the terrain - you can do this whilst also learning how to perform a 90° hook turn.

1. fly away from terrain (preferably a slope so that you are having increased altitude)
2. perform a 90° hook turn and go hands up
3. observe the terrain beneath you whilst using your peripheral vision to also work out your altitude loss in relation to the slope that should now be at your side (left or right depending on your turn direction)
4. your recovery arc will be complete once you feel the glider flattening out completely from the dive you induced
5. some gliders may even convert the excess kinetic energy you have created and fly 'up'.

Barrel Rolls/Looping

It's important to understand that rolling your glider is an advanced maneuver so always get advice from an advanced pilot or speed flying instructor as to the best way to start learning.

The following points are a guideline and should only be used alongside qualified instruction:

1. Height is safety! Before attempting a barrel roll you should have enough height for it to not go perfectly. (i.e. you should have plenty of height for a diving 360 turn!)
2. Your first rolls should not be directly up over the wing, that is something you will build up to with good timing and building the right amount of energy.
3. Every wing is different, roll characteristics with loading can change a lot so understanding the maneuver with a glider is important. Attempting a barrel on a wing with less loading or less performance than you are used to could lead you to spin the glider, due to the feeling that you need more input than normal. It is always better to put in too little input vs too much **SPINNING A SPEED GLIDER IS EXTREMELY DANGEROUS!**
4. Trimmers should be left in to start with, the maneuver is not made easier with speed. It takes timing and transition of energy.
5. The Energy coming out of a 90 turn should provide plenty of energy given the right timing.

Landing

When Landing a speedwing it's important to be able to bleed the energy and speed out of the wing.

1. Speed dive
2. Round out (use up speed horizontally)
3. Flare

Flare Authority

Flare authority is having enough energy in your glider to allow you to reduce your rate of descent and ground speed for landing. This energy comes from airspeed. If you come in on final carrying 20% brake for example your glide angle will be made steeper and your ability to flare when you get to the ground will be dramatically reduced, resulting in a hard landing.

Tailwind Landings

Tailwind landings can be fun but there is always a place and time to attempt them, they require a high level of skill and a good understanding of the wing you are flying.

Your ground speed will be increased by exactly the wind speed, so if you are coming into land in zero wind at a ground speed of 50kph then the wind picks up to 15kph and you decide to come into land tailwind now your landing speed will be 65kph,. As well as your ground speed increasing, your glide angle will also increase, and this could cause you to overshoot the landing field. So when planning your approach make sure you have buffer room to overshoot. (In the same conditions if you were to land into the 15kph wind your ground speed would be down to 35kph)

PLF (Parachute Landing Fall)

You will have learned these in your PG2 License, It's good to practice your technique and remember that it's not limited to rescue parachute landing. It could reduce your chance of injury from any hard landing. Remember that two legs locked together are far stronger than two legs spread apart.

Landing Areas

Making sure you are confident with your landing options before launching is very important.

There are lots of things to think about when it comes to a suitable landing area and it can be hard to assess these things from the air especially at speed: Powerlines, long grass, fences, uneven terrain, slopes etc. It can be a very good idea to visit the landing area and go through your landing options in your head. You must also take into account your Ability, Currency, Daylight and Choice of Glider.

On any landing approach you should have options if you overshoot or undershoot your landing, where will you end up? How will you make the best landing given those situations? When you take those options into your plan for your approach it's easier to keep your composure and awareness throughout your approach.

Slope Landing

Landing on a slope should be done using the same theory as slope landing on a paraglider: Landing across it as opposed to up or down it. Depending on the terrain, wind and the wing you're flying, this can be a very challenging landing that requires a high level of skill.

Feet Down

Landing on your feet can add a big safety buffer to your landings, your legs should be considered as shock absorbers and be the first thing to touch down every time, they will do a much better job taking any impact than your spine will and given the fact the majority of speed harnesses have no back protection the control you have through your landing should not be taken lightly. It also gives you more margin for error during fast landings. Making sure you have the ability to transition from seated to standing easily in your harness is very important. You can practice this by hanging your harness from somewhere secure. This is a good idea, especially when you get a new harness to fly. When transitioning, your hands should always be independent from your movement and continually control the glider. Don't grab the risers! This is very bad practice for more reasons than one.

High Speed Swoop Landings

“Hook turn” or “Swoop” landings take expert judgement and should be considered an advanced manoeuvre.

The Basics

Swooping is an extremely exciting, but dangerous skill which entails a fast speed approach towards the ground, before levelling off a couple of feet above the ground to cover as much distance as possible, in a fast horizontal swoop.

A swoop does not need a ‘hook turn’ to be performed, a swoop can be accomplished on a long final with a Speed Wings natural glide. A progression can be to apply even brake to induce the wing to pitch back and then surge forward to develop increased speed. This technique should again be practiced slowly with enough altitude to establish the recovery arc of the glider. Any swoop manoeuvre needs to be well thought out covering the following: Wing type + Wing loading, trimmer settings, Height, position over the landing, degree of rotation (if using a turn), overshoot options and the wind strength & direction.

It’s always best to seek training before attempting.

Advanced - Hook Turns

Turning 90° into landing is the standard ‘hook turn’ approach, it creates a nice amount of energy, and you always have a good visual of the landing making it much easier than a 180° or 270° to judge and control the approach. It is crucial to note that your speed of turn will have a dramatic effect on how much energy is created/how much height is lost.

Progressing slowly from 90°’s is important, a 270° vs a 90° requires you to turn your back to the landing this increases the level of difficulty dramatically. Why increase from 90° to 270°? Because if you realise you are too low to start the 270°, you always have the 90° as backup. Knowing your landing area, your height at all times, your position compared to landing, and an extensive knowledge of your wing’s characteristics, is needed before attempting this.

180°’s can add extra challenges. The reason for this is that you must approach directly over your landing area, shutting down your options should you misjudge the approach. You lose the visual of the landing before making the turn so judging when to turn becomes hard. There is only 1 good spot to get the 180° perfect so if you are too low on approach, you must commence the 180° early, and you will likely overshoot the landing, alas if you are too high, and do the 180° anyway, you will likely overshoot the landing.

Note:

- Having a base leg to make the 90° or 270° from will give you a good visual of the landing spot until making the appropriate turn.
- 270°’s and above are dangerous and should only be practised by highly skilled and trained persons, as you turn away from the landing.

Being in the corner

The term ‘in the corner’ means to be making a turn into landing, and the natural arc of the turn you have made will put you into the ground, before the arc of the turn has naturally finished, meaning that you must make an evasive manoeuvre using your brakes to not hit the ground. Every wing is different even the same models loaded differently can dramatically change the dive retention and dive recovery of a wing. Always get to know a wing before pushing your limits on landing approaches.

Speedriding and Ski Launching

On skis it is possible to launch in less than ideal conditions due to being able to reach launchable air speeds due to the high speed that the skis allow you to travel. However, once airborne you then have to deal with the ground speed and potentially dangerous air that can change throughout the terrain of any mountainous area.

Always have a plan. If you are ski launching make sure you have good landing options for your skill level, landing on skis takes practice. It's also important to note how difficult depth perception can be on snow especially a flat un-skied area. Avoid diving turns on your approach and remember when landing on skis you can land with horizontal speed and continue skiing so you do not need a hard flare.

When flying a speedwing on skis you generally increase your wing loading significantly due to the equipment you have with you. Just your skis, boots and bindings will add approx 10Kg to your flight weight. It can definitely change the flight characteristics of the glider to those you are used to from foot launching.

Speedriding

Speedriding is considered as having the skills to spend as much time on the snow whilst flying the wing, as flying. Building the skills to keep the glider above you and in control whilst skiing without leaving the ground takes a lot of practice and dedication. Once you build these skills the possibilities of what is possible to ski and fly are endless.

Wings generally used for Speedriding have a slower stall speed and less glide performance wings that have higher performance can still be used but it takes a much higher level of skill to connect the two disciplines of skiing and flying. Choosing the right sized wing is also very important but this depends on the slope being used, your weight, the conditions, and the type of speedwing.

Note: your skills skiing directly affects your skills speed riding so work on your skiing as a priority before jumping on a speedwing expecting it to all come naturally.

Mountain Flying vs Coastal Flying

Never underestimate the difference between coastal flying and mountain flying. Especially when it comes to soaring. On a speed wing you require much higher wind speeds than a paraglider so an inland soaring site which is suitable for paragliders is not necessarily suitable for speedwings due to the increased risk of turbulence.

- Low wind vs high wind
- Why soaring in the mountains can be dangerous.
- Thermals and how they affect your line.

Springtime comes with thermal conditions. The best time to fly any form of proximity is generally early in the morning before the thermals, or valley breezes / sea breezes have a chance to come in. Winter is a calm smooth time of year, Remember katabatic winds when it comes to finding a place to foot launch or landing in a tight spot

- Turbulent vs laminar wind

Wind in the mountains is always turbulent somewhere. the higher the velocity of the wind and the bigger the object the more turbulence there will be.

Mountain

(For any pilots coming from coastal flying into the mountains for speedflying there is a lot of new skills and assessments to be learnt. you should never think the wind strengths that you fly on the coast is okay to fly inland)

Flying in the mountains especially hike and flying demands a good level of skill and decision making. You must have a good Weather picture.

- Always know what the **upper level** winds. Are you on the windward side of the hill or the leeward?
- Know what the wind is doing at your **landing** altitude as this could be completely different.
- If it is coming up the hill where you are planning on **taking off**, is it consistent and why?

Turbulence

Wind turbulence is created by the size of the object and the velocity of the wind speed, hence if you choose to fly in strong winds around mountains, trees, buildings or other terrain you should expect turbulence. The degree of turbulence to be encountered can be manageable or not. On a paraglider you generally have a rescue parachute and back protection built into your harness. When speed flying you generally have neither of those. On a paraglider you generally have good enough glide to fly away from turbulent areas but on a speed wing you often don't.

Thermal turbulence is a result of the instability of a day, this instability changes with the lapse rate, clouds, time of day and time of year. If you are planning on speedflying following close to terrain you should avoid flying when the air is thermic (unstable). Choose wisely your time of day and conditions.

Yes a speedwing has a higher wing and in turn more internal pressure which makes a speedwing less susceptible to collapse. However a collapse on a paraglider can often be easily managed through weight shift and brake input. On a speedwing you should expect a collapse to be faster than you are able to react to and the re-inflation to create a sharp direction change and severe loss of altitude. Unless you have excess altitude this is likely to lead to a terrain strike.

Choosing where and when to fly

- Dawn or Dusk are the times when the atmosphere is most stable, especially in the summer months this can be the best time to speedfly.
- Always be prepared to walk down. It can be hard, especially after a long walk up but having the good sense to know when not to fly is the most valuable skill you can have.
- Be prepared for the environment you are in. Weather can change quickly so you should always have basic survival equipment for where you are:
 - Warm clothes
 - Communication: Cell phone, PLB, intentions left with somebody.
 - water, food
 - Torch or headlamp

Coastal Soaring

Coastal soaring on a speedwing is a lot of fun, due to the laminar nature of onshore coastal winds it can be fun easy soaring. Onshore coastal winds are so smooth due to there being no objects restricting the airflow across the water. But you must still be aware of weather changes that can make coastal air less stable like large cloud cells creating gust squalls and wind fronts. As wind strength increases it will become more turbulent, even across water, and gust strength will increase possibly leaving you with no penetration to a landing.

Choosing the right wind strength for your wing and ability is important to keeping it safe and fun. You can use a handheld anemometer to measure wind strength and help make a more educated decision on when to get your wing out of the bag.

Understanding compression areas can help you decide where the best place to launch is and where you need to be careful. By moving down the hill you can get out of the strongest wind but you still need the wing management and ground speed once you are airborne in the compression zone.

360 degree turns should be avoided when soaring. Your ground speed will accelerate dangerously fast, consequently you may not have height or space needed to clear terrain and complete the turn. Before any turn close to the ground you should be 110% sure that you have plenty of space to complete the maneuver.

Top Landings

Top landings take practice. When you first think about coming into top landing always leave options to fly away and give it another go. Starting with touch and go's to allow you to practice getting your height and positioning right whilst keeping a safe amount of air speed and avoiding potentially stalling the glider is very important. Pumping brakes whilst coming into touch down is bad practice and should be avoided, instead you should use timing and accuracy to make a clean smooth connection with the ground.

Coastal Landing Areas

Always check your landing areas and plan early as to how and where you will land. It's important to pay attention to changing conditions including tide's. Often it's worth walking down to a potential landing area and inspecting it for size, steepness and other hazards. From launch it can be impossible to make a good assessment as to what to expect of the landing area.

Ground handling in no wind is the key to safe mountain flying

Practicing forward launching in less than 5kts of wind is important to safe controlled light wind launches. Learning forward launches with and without using A risers can be helpful for different launches and wind speed. In zero wind using a good "A" riser launch technique you can have the glider set above you in less steps, getting you into the air under more control and with a shorter run.

Ground Handling in wind Is The Key To Safe Coastal Speed Flying

Wing control is everything. When coastal soaring if the wind is strong enough to keep you airbourne it's strong enough to drag you. Learning your limits of wind strength by building up slowly is the best way to practice wing control. A flat open area without hazards or obstacles is best.

Weather

How thermals affect your flight

- Strong thermic conditions should be avoided on a speed wing. Especially when it comes to proximity flying this is not the time!

The more you understand about weather, the safer you will be as a speedflying pilot. Thermic conditions are often what paragliders are waiting for on launch; however for a speedflying pilot they can make for very uncomfortable or even dangerous flying. Knowing when the air is reliable enough to be flying with proximity and when it's not is hugely important!

Basic rules for understanding when it is most likely to be thermic:

1. Time of year. Spring and summer months are the most unstable time of year.
2. Is the sun directly on the terrain you plan on flying over?
3. What are the clouds doing? Fast developing fluffy clouds (cumulus clouds) generally suggest thermic conditions and as they develop to being black bottomed it suggests it's more unstable in the air.
4. Are you on the Lee Side of a mountain? Low pressure on one side of a mountain/ridge can create unstable leeside thermals and sudden changes in wind direction and speed above ground level..

Clouds

Clouds tell you a lot about the weather and current conditions. They can help you see the stability of the day, the upper level wind speed and direction and even approaching weather fronts. The more you learn about weather the safer you will be as a pilot.

Lee side

Lee side conditions are widely dictated by the velocity of the wind. Always remember that just because the wind is coming up the hill where your planning on flying from does not mean that you are standing on the windward side of a hill or mountain. You should always know what the upper level wind (above the terrain) is doing as well as the lower level wind (landing level).

- Why flying in the lee is dangerous
 - Unpredictable lift and sink can be widespread
 - The air can become so turbulent you will struggle to keep a speed wing inflated.
- What inversions mean for your flight
 - Fast building cloud in the morning
 - Generally strong inversions come with fairly stable conditions however they can also trap wind at lower levels that could catch you unaware

Rotor vs Leaside

Areas of expected turbulence/rotor should be avoided at all times. Especially during low level flying and or landing approaches. Rotor is generally referred to as a large eddy of air in which the air rotates or circulates around the horizontal axis, generally behind a ridge or large object. (Also be aware of Point Rotor, which forms around the vertical axis when the wind curls around a large feature such as a headland or bluff.) The severity of rotor is directly affected by the velocity of the wind and the size of the object the wind is traveling past, speedwing pilots need to be especially aware of these areas especially whilst soaring due to the higher wind speeds required to stay airborne on a speedwing.

Flying the leaside of a mountain can be possible but should be done with extreme caution. Knowledge and experience is required, it can be very site specific as to how flyable lee side conditions are, you must take your time assessing conditions and always know how strong the wind is on the windward side of the mountain. In general flying in the lee of a mountain should be strongly avoided!!

“It is always better to be on the ground wishing you were in the air than in the air wishing you were on the ground!”

Airspace, Flying Sites and Code of Conduct

- Swooping people puts them in danger and can be enough to have your license suspended.
- Swooping animals is a great way to upset farmers and jeopardize sites.
- Swooping and Landing on roads is an illegal practice that should be avoided except in an emergency.
- Speed riding within ski areas always needs prior approval by the ski area manager
 - There are ski areas that allow speed riders however it is a privilege that needs to be respected, permission and guidelines for the area should be sought before commencing with any speed riding.
- Land owner approval should always be sought before flying or access. People work hard on the relationships that allow us all to fly around NZ. It just takes one person to upset a farmer / landowner and lose a site.
- Remember you are flying under the NZHGPA [OPM](#) (Operations Procedure Manual)
 - Found on www.NZHGPA.org.nz in the member's area under forms.

Flying with Other Speed Wings

Be careful of peer pressure and hype this can create a huge distraction and/or encourage you to fly in a manner you otherwise would not have flown in. Slow down, make sure you have an idea of what each other are planning for the flight all the way to your landing. Who is going to be landing first? It can make sense that the pilot on a bigger wing should go first so you can fly together. However, that can go badly wrong when two pilots are coming into land at the same time and one of those pilots plans a tail wind swoop. If you are flying in the same space, make a plan and know what you are all doing before you launch.

Giveaway Rules

- Always turn Right to avoid a converging collision with another pilot.
- If the ridge is on your right you have right of way (a subtle turn towards the ridge can help inform the other pilot where he needs to go)
- The Lower Pilot has right of way regardless if you're descending faster than them. You must always give them space to continue their intended flight path.
- When flying with others ALWAYS look before turning!