How to land a hang glider great every time

Whilst at the landing paddock the other day, I couldn't help but notice that some pilots fail to land gently, instead they just "arrive" at the ground. In fact this is not just a localised occurrence; you will see it happen now and again all around the world.

Many people notice this, in and outside of our sport. Many people therefore assume hang gliders are hard to land. This assumption is far from the truth, I know from experience hang gliders have never been easier to land! All you are required as a pilot on the latest aircraft is to let the controls go and take a few steps if you are close enough to the ground to land! Name one other form of aircraft that requires that of the pilot to land.

You have to then ask yourself, are pilots who land poorly doing something wrong or is the equipment making them do it wrong?

The answer is often, both.

Some models of glider aren't as easy to land as others because they require "more accurate flare timing" or put to put it another way, have less pitch stability. **These gliders require the pilot to be very gentle on the controls to be able to feel trim position prior to flare.** This is typical of poorly tuned high performance gliders.

A gentle touch on the controls prior to landing is promoted by relaxing the grip, this requires confidence that the glider will fly fine and your harness will remain upright without holding on tightly. This confidence is often established by having a correctly tuned glider, a well designed harness and landing practice with success. So if you're struggling with confidence you won't have a relaxed grip. This you need to practice with the right glider first with all the right equipment to gain confidence. You need a pitch stable glider that is correctly trimmed and tuned, a harness that stays upright on landing approach and practice.

The best results from practice can be gained with feedback from an experienced hang gliding instructor/coach, or alternatively using this guide combined with video footage of your landings for self-assessment. **A trap with using a video is that when an unsuccessful landing is viewed too often it is easily etched into ones mind only to reappear in the form of action during a similar stressful moment, such as the next landing.** Get your camera-person to edit for you.

Why do some pilots land great and make it look easy every time no matter what they are flying?

Assuming the basic skills whereby most pilots can fly the glider wings level, down to an altitude that's safe to fall from, **there are three skills to display before you become a 'landing legend.'**

Skill one.
You must be willing and able to **reliably slow the hang glider** to trim speed, the airspeed that's about 15% faster than stall speed.

Trim speed is the speed that the glider flies with no pilot input, which means all of the pilots' weight must hang from the harness only. This most specifically means no weight or input on the uprights or base bar! A pilot that hauls their weight upright whilst trying to flare will be unable to produce a strong enough pitch-up input because there is some weight remaining on the controls (forward of the CG) so the pilot weight is unable to be transferred adequately to the rear. This often results in the glider stalling and not flaring. There is a difference. When a stall begins on a hang

glider the nose area produces less lift, the tips (rear of the CG) begin to produce more lift, this lift raises the rear of the glider and the nose drops. The pilot gets a few steps and the glider overtakes them to nose down in front of the pilot. This pilot assumes their arms need to be longer to land this glider, as we just learnt, their assumption is not correct, the pilot has to let all of their weight hang into the harness. This will enable a higher nose-up wing attitude and a real flare to occur, resulting in the wing stalling all the way out to and including the tips.

When landing a poorly trimmed glider it is far harder to establish the correct airspeed prior to flare. Trim variations can occur through sail shrinkage or incorrect adjustment of frame, battens or CG/hang-point. These variations can occur through normal **and abnormal** wear & tear. Gliders that have soft batten or frame material can easily have the batten or frame shape altered from a simple nose-in or rough placement on a rack and consequently suffer an alteration of the pitch stability and trim speed!

To make sure your glider is trimmed correctly, fly it prone in smooth conditions. If trimmed correctly, the glider should stall when you push slowly out about 100mm from the hands off bar position.

If you have an airspeed indicator it is easier to determine 15% faster than stall.

So after correct adjustment of trim you should be able to RELAX YOUR GRIP to find trim. If in doubt about any adjustment, ask your instructor, dealer or manufacturer.

Skill two.
You must be willing and able to **raise the nose** of the glider to full stall / flare angle of attack.

After correct trim adjustment and the pilot being able to let go to find trim, the inability to raise the nose for flare is often due to the pilot hanging too low. This can seem as if the pilots' arms are too short once again. The pilots' arms appear too short because most of the arm length is taken up just reaching out to grip the uprights at the wide part of the A-frame! (see Fig 1 position B below)

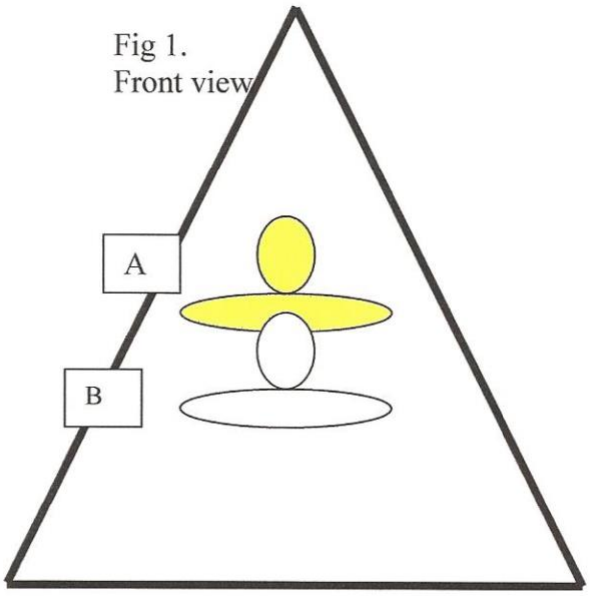
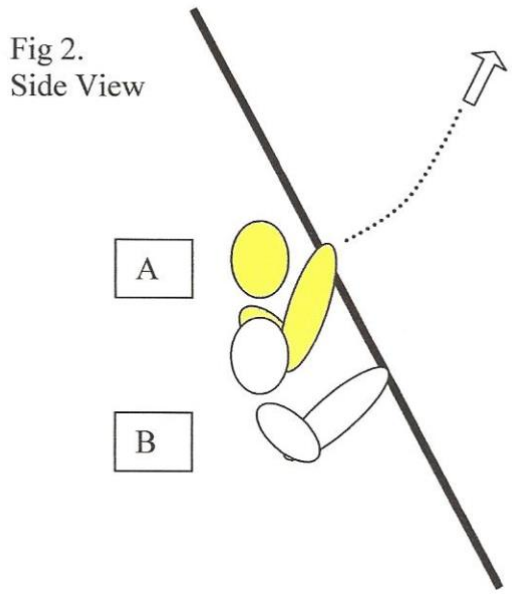
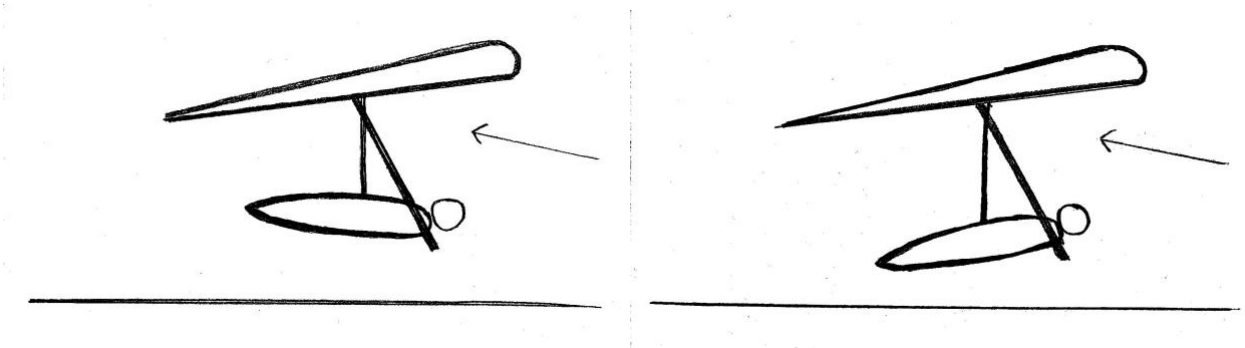


Fig 1.
Front view

Additionally, most A-frames are raked forward so the pilots' shoulders, upright and in trim, are even further back in relation to the grip point – making their arms appear even shorter. It's hard to get the nose up (or push out and up) if the arms are straight before you start flaring! This pilot (see Fig 2 position B below) needs to hang 100-200mm higher in upright position, and will have to adjust the hang loops or harness accordingly to be more like position A.



After adjustment of the hang loops, the correct chest/base bar clearance (in prone) can be set by adjusting the head-up/down rope, and should result in a slightly feet high attitude (compared with the horizon, in trim position). **You will notice that the pilots who land great also have their feet slightly higher than their head whilst in prone. This body angle provides less drag so therefore they glide better and climb quicker than the pilots that don't align themselves with the airflow.**

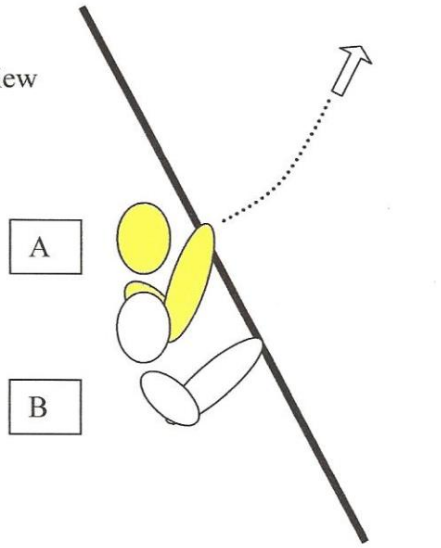


Feet high attitude ***Feet low attitude***

Some harness designs do not have a head-up/down adjustment so the leg-loops may need to be tightened to raise the pilot whilst in upright position. If this cannot be done due to the excessive girth of the harness forcing the leg-loops to be uncomfortable in prone, trade it in for one that fits properly. If in doubt see your instructor, dealer or manufacturer.

Additionally, as we stated earlier, inability to raise the nose in a flare can be due to the pilot holding on too tightly therefore inadvertently transferring weight forward onto the control frame. For a more positive nose up result, the pilot **must push mostly upwards**, with a open grip. The hands should be at ear/eye height prior to flare. Hands must be open enough to avoid loading the controls with any pilot weight (see Fig 2 curve below). An upwards push on the controls will produce an additional downwards force through the hang point, delivering a more effective nose up rotation.

Fig 2.
Side View



Some pilots do all these good things but they swing their feet forward as they flare, destroying the rearward weight transfer. Ensure the legs and feet are held rearward and in-line with your body, this is done by gently arching your back, as if you're standing up straight to be measured for height.

Most of these details are taken care of when flaring using the rear wires. If this concept appeals to you, take care to practice steering the glider with your hands on the rear wires at altitude firstly, and secondly, do not attempt to flare any higher than you would like to fall from.

Skill three.
You must be willing and able to **run a few steps** so as to let the glider settle behind you when your feet touch the ground.

When good landings occur you will notice that the pilots legs just coast to a gentle stop with no braking effort. Think about aircraft that land on wheels, the legs should work just the way wheels do (except your legs will handle more cross wind). Lets now think about an aircraft landing with the brakes locked on. Remember coasting steps!

If you have corrected the trim speed on your glider, got your harness in a hands free upright position, are adequately high in the control frame, flared upwards with open hands and run with coasting steps but there is greater groundspeed than your legs can keep up with, try landing into the wind!

Summary of a graceful landing technique.

1. Ensure your glider is trimmed properly, and harness is set up correctly.
2. Approach the landing zone with faster than trim airspeed.
3. Make sure wings are level and heading is consistently along your intended (adequate length) runway.
4. Relax some of the extra airspeed smoothly so you fly level at a height you feel safe to fall from. (less than 3 ft for me).
5. Find trim speed by relaxing your grip on the controls, identify you are touching only the back of the uprights and all your weight is hanging in the harness. Arch your back slightly to hold legs and feet rearward.
6. Flare out and UP - swiftly if you have a lot of ground speed, - slower if only a little, - no flare is required if no slowing is required (like on a windy day).
7. Coasting run to a gentle stop.
8. Wave to the spectators as you carry your glider from the landing area.

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