

Landing in water

DR GRAHAM TYDEMAN PUTS THEORY INTO PRACTICE

I suspect most of us who have flown coastal sites have wondered what we'd do if the lift suddenly died and bottom landing options all disappeared. So, despite some reservations from my instructor, Lee Tryhorn at Free Flight Academy (www.freeflightacademy.com), it was agreed I could deliberately land in the water on my forthcoming SIV course.

I frequently fly over water when combining sailing and flying on the west coast of Scotland. If I was really stuck, would I aim for a small rocky foreshore with the risk of broken bones, perhaps ending up in breaking waves, or should I head out into open water? There are clips on YouTube of near-disastrous events where pilots have tried to fly back to dry land but ended up in rocks or breaking waves and surf. If open water is better, what's the best way of not getting tangled in lines and glider and being able to swim away?

I have discussed various theories over the years of what to do if the worst came to the worst, and almost unanimously, a downwind water landing was recommended. At first glance the logic is appealing – the glider carries on overhead and the lines are under tension as it smacks down, leading-edge first, reducing the risk of entanglement. Some even suggested that the air trapped in the wing would provide some buoyancy while waiting for rescue.

Almost everyone agreed that jumping out before hitting the water was the least sensible option. While jumping early might make sense in theory as the best way of staying clear of glider and lines, timing would be critical. At descent rates of 1 - 2m/s just a few seconds early could make a life-threatening difference to height, especially when prompted by fear. I heard several stories of pilots who came to grief this way.

Of the few I spoke to that had actually landed in water, most had done so after deploying a reserve. Of the one or two who simply hadn't made it back to the shore, again it had been on an SIV. With an auto-inflating lifejacket they'd stayed clipped into their harness and had been able to breathe adequately. However they described being instantly tangled in a web of lines and needing to be rescued. It became clear that it was almost impossible to undo harness buckles when they were under any tension, even if it was just a gentle wind catching the glider or reserve and slowly dragging the pilot through the water.

For my attempt it made sense to enter the water already unbuckled, although it was not a great idea to risk falling out. I fly with a Karpofly Fantom Extralight pod harness which has an inflatable back protector. Great extra buoyancy perhaps, but if I was still clipped in it could hold me face down. I practiced with the harness

hanging from a tree to see how quickly I could undo the buckles and how safe it felt with none done up. Having removed chest strap and pod clips, it only took a few seconds to unclip the remaining two that held leg and waist straps. Despite not having a seat plate it also felt unexpectedly secure, particularly when sitting upright and holding onto the risers.

I felt confident that on my final glide I could sit comfortably and safely until I hit the water. While flying without being fully strapped in is far from ideal, it was likely to be very much the lesser of two evils. I intended to wear a lifejacket, but not one that would auto-inflate on contact. It could be easily deployed by pulling the handle, which I also made much bigger and easier to locate by taping a big chunk of foam to it. However swimming is much more difficult once a lifejacket is inflated; as many people fly over water without one I preferred to only use it if I really needed to.

With more than one safety boat at the ready, radio contact established and a clear set of signals organised, I was all set. I planned to land downwind, try to tumble out of the harness as I hit the water and see if I could swim away without becoming too tangled.

However just before getting on the bus up to launch, one last opinion was offered that changed everything – I should land into the wind and keep hold of the brakes. A bit of reflection made me realise this made so much sense, and suddenly the plan changed. School physics was recalled: the conservation of momentum. As a single unit of pilot and glider, the total mass multiplied by the velocity was our total momentum. That momentum would be divvied up as soon as separation was achieved, and having over five times the mass of the glider and harness I'd be taking the lion's share of the momentum with me. Imagine riding a bike into a low wall at 15 - 20 mph – you're not going to stop instantly! If I flew downwind the velocity would be much greater, which in turn would increase the total momentum.

Key to the idea were two important details. Firstly, it was vital not to leave the harness until my feet touched the water and, secondly, I needed to keep hold of the brake handles. In addition, to avoid having to think about two things at once, I would not try to actively brake as if coming in to land – simply leaving the harness would do that for me provided I kept hold of the handles.

In this way, all I had to think about was timing my jump out of the harness. As I surged forward into the water I'd be pulling more and more brake and should leave the glider behind me.

It seemed so logical, like initiating a full stall (practiced over the previous few days). The wing appears to drop back, but in reality the pilot continues forward leaving the wing behind. The same energy that creates the forward pendulum swing in a full stall should also send me clear of glider if I got the timing right.

Finally, by landing into the wind away from the shore I could be comfortably distant from the danger of a shallow rocky shore or breaking waves. The height of waves is lower in deeper water (a tsunami may only result in wave a few feet high in deep ocean). In the real situation, trying to time things just right to land in deep water while flying downwind towards the shore would not be easy, particularly if that shore was comprised of large rocks and crashing waves at the bottom of a cliff.

I made my final approach over the beach, heading out to sea directly into wind. I calmly took off my sunglasses and zipped them away. When clear of the beach and at the last moment, I unbuckled completely, put my arms behind the risers for a clean exit but held onto them, along with the brakes, for more security. In the final moments I looked down at my feet and nothing else – I was determined that I would not jump until my toes touched the water.

I slipped out the harness as soon as I made contact. I came up to the surface at least two metres clear of both glider and harness, still with both brake handles in my hand. I'd jumped with one in each hand but must have transferred them to one hand when underwater – it wasn't part of the plan but made no difference. It couldn't have been easier and there were no lines anywhere near me at all.

We'd agreed that if I looked happy Lee would hang back in the boat so I could really experience how it would feel if I was on my own. The glider caught some wind and was being gently blown towards the shore, which combined with the drag from the harness stretched out the lines. To extend the experience I swam back and started to mushroom up while still in the water – without difficulty and without a single tangle.

As I only had one thing to focus on, timing was surprisingly easy. As soon as I left the harness the sharp pull on the brakes lifted the harness up and even more clear of me. This can only really be seen in the video*. I believe that if I had entered downwind, although the glider might have gone overhead initially, I would have surged forward and, particularly with the extra speed, ended up amidst the lines and glider, instantly tangled and in serious trouble.

Paraglider pilots have died landing in water. Aside from the most obvious point – don't put yourself in a position where water landing is a possibility – my key points are:

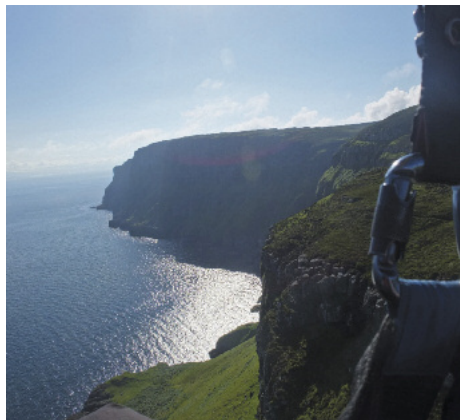
- Wear a lifejacket if flying over water
- With your harness suspended in a test rig, practice what it's like to undo buckles and test how secure it feels without them
- Head directly into wind towards safer, deeper water
- Only at the last moment, unbuckle completely
- Don't try to flare. Concentrate only on jumping out of the harness as soon as your feet hit the water and not before
- Keep hold of the brakes

This was my second SIV, and my water landing was only one small part at the end

of a thoroughly excellent course. I have come away a more confident, safer and even more enthusiastic pilot. My first SIV was rather formulaic, going through a pre-set syllabus with no room for discussion or variation. With Lee all options are considered and discussed; the course is truly individualised. as this unusual experience surely demonstrates.

I shall continue to do my utmost to avoid another water landing. But if I ever had to, I am confident that this technique would be the safest.

* A video of Graham's experiment is at www.youtube.com/watch?v=vHixGwq3_pU



Sometimes, bottom landing options are limited – Canna, one of the small isles in the Inner Hebrides



Don't leave the harness ...



... until your feet actually touch the water



The moment I surfaced – well away from harness and lines with wind in the glider taking it further away



Chucking away the brakes, after surfacing



Graham celebrates the joy of being alive!

All photos: Graham Tydeman

WATER LANDINGS: THE FACTS

'The sad reality is that landing a hang glider or paraglider in water will almost always result in the pilot drowning. The only exceptions are prearranged arrivals into calm, warm water close to manned safety boats, as seen at SIV courses, hang-gliding aerobatics and paragliding acro competitions. There have been some close calls even in these circumstances.

'An unplanned arrival in winter into a heavy swell off the British coast, dressed in full flying gear and with nobody on hand to effect immediate rescue, is going to be fatal. How good a swimmer you are is of absolutely no importance, as nobody can swim in a hang gliding harness or wrapped in paraglider lines.

'Never fly out of range of a safe landing area – ever! Crashing downwind on a beach might be survivable – going into the water is not.' Source: *The BHPA Pilot Handbook*.

The FSC's advice is the result of long and bitter observation of our own fatality data. At least ten BHPA pilots have drowned after landing in water. The FSC continues to be concerned that there

may be a belief among pilots that they are likely to get away with a water landing, and our advice is not to attempt it.

As he describes in his article, Graham sets out with careful and comprehensive preparation and the express intention of landing in water. However most non-SIV water landings are last-minute 'Oh s**t!' incidents, where none of his precautions will have been attended to. Further, most inadvertent water landings are in shallow water where the pilot doesn't quite make the beach on a day where there has been a soarable wind. In such circumstances (e.g. possibly strong surf and undertow) things get a lot more difficult.

Water is around 800 times more dense than air. Other things being equal, the forces affecting an object in moving water are 800 times greater than those in moving air. Anyone seeking to explore Graham's technique should do so with a rescue boat in attendance. We continue to advise that unless you have proven in advance that you can walk on water; you should make every effort to avoid landing in it.