

Spiral dives - still a problem

Chris White, Senior Instructor and guide at Escape, explains the spiral dive problem - and reveals new technology designed to reduce spiral dive incidents.

DURING OUR SIV COURSES, THE FULL STALL ALWAYS USED TO BE THE MANOEUVRE THAT PILOTS WERE MOST APPREHENSIVE ABOUT PERFORMING. Recently however, spiral dives have replaced stalls in this respect. One reason for this has been the emerging trend over the last decade or so for paragliders to "lock" into spiral dives.



PHOTO: CHRIS WHITE

Iain Robertson stalls during an Escape SIV course in Turkey. Stalls are no longer the bogey they once were.



Spiral Buddy in action during a spiral dive

PHOTO: BASTIENNE WENTZEL/THE RISER

A glider is said to lock in when the initiating brake is released and the glider shows no sign of recovering. This could be an acceptable feature of high-performance or competition wings aimed at highly-experienced, skilled pilots; unfortunately it has affected all classes of paraglider.

You may well ask how these gliders passed certification with this undesirable characteristic. It's a very good question. Until last year, paragliders were only tested at a descent rate of 14m/s during EN and LTF certification, and categorised according to their recovery behaviour only from this descent rate.

You will be pleased to hear that the EN and LTF certification process now tests paragliders at their maximum descent rate in spiral dives and categorises them accordingly. If a glider displays a spontaneous exit from a steep spiral it gets an A classification; if it requires pilot action to recover it gets a D. To get an A the recovery also has to be within 720 degrees of rotation; recovery within 720 to 1080 degrees - two to three full turns - earns a C category, and if the turn remains constant (i.e. locks in) the glider gets a D. The maximum descent rate in metres per second is also recorded in the test report.

This is certainly reassuring - and not before time. But does it solve the problem? Well, no it doesn't. In my opinion there are still three potential problems.

1. We don't all fly brand-new wings that have undergone the updated tests, and it will be a long time before we do. In the same way, we don't all drive post 2012 cars.
2. Any glider's certification is only valid if flown with the same harness at the same settings and weight as that used during testing, so the problem of gliders locking in could still exist even after the introduction of the new, more stringent tests.
3. A 14m/s spiral dive can produce forces in excess of 3.2g. Recent studies have shown that 2g can be enough to cause g force-induced loss of consciousness or "G-Loc".

The BHPA produced a safety notice regarding "Nose-down spirals" in November 2008 which you should all be familiar with [SN 031: 11/2008 - downloadable at www.bhpa.co.uk/documents]. In fact there is lots of information out there regarding spiral stability and recovery techniques, but this is of no use if your particular glider/harness combination locks in and you are susceptible to G-Loc.

The onset of G-Loc is often (but not always) manifested by visual problems: seeing stars, tunnel vision, black-and-white vision and loss of vision. If you experience any of these symptoms, stop spiralling immediately.

There are other rapid-descent techniques, but unfortunately none are as effective as spiral dives. The next best are B-line stalls, but with manufacturers' manuals advising against B-lines - and some new line configurations making the manoeuvre unstable or impossible to perform - spirals are becoming an even more important weapon to have in your arsenal.

How can we practice spiral dives safely?

G-Loc is caused by a lack of blood sugar and oxygen to the brain and eyes. Both substances are supplied by blood flow. G force acts like a centrifuge making blood drain from the head. The onset of G-Loc is often (but not always) manifested by visual problems: seeing stars, tunnel vision, black-and-white vision and loss of vision. If you experience any of these symptoms, stop spiralling immediately.

A number of factors will reduce your ability to cope with G forces, and almost all of them can affect most pilots on a regular basis:

- Most medications will have an adverse effect
- Tiredness
- Alcohol consumed within the last 24 hours
- Caffeine
- Stress
- Low blood pressure
- Low blood sugar (eat regularly)
- Illness
- Dehydration.

Mechanical solutions

As the spiral-dive issue has gathered momentum, there have been several innovative devices and ideas that are worthy of consideration.

Among the first was the Ozone Anti-G parachute which has been around for several years. The procedure with this



Close-up of Spiral Buddy parachute and release weight

PHOTO: BASTIENNE WENTZEL/THE RISER



Spiral Buddy designers Bart Adriaens (L) and Ronald ten Berge of Action Air Sports

PHOTO: BASTIENNE WENZEL/THE RISER

device is that you deploy it before entering a spiral dive - the extra drag produced by the parachute reduces your airspeed and thus G forces. I have tried this myself; it is easy to use and it certainly works. When you have lost sufficient height, you simply pull on a tab connected to the apex and de-power it before stowing it away. The only down side was that I couldn't get as good a descent rate as I would normally expect from a conventional spiral dive. Check it out at www.flyozone.com

Another technique that we have experimented with was brought to our attention by Alain Zoller at Air Turquoise. The pilot pulls in a 40% asymmetric collapse (a big big ear) on one side of the wing and holds it in, then enters a turn to the opposite side, with plenty of weight shift to avoid spinning, gradually applying more brake as the turn tightens into a spiral. This achieves a good 14 - 16m/s descent but with much-reduced G forces. Although this manoeuvre isn't tested during certification we now teach it on SIV courses. Please don't try this on your own.

In 2008, Ronald ten Berge and his colleagues at Action Air Sports in Holland were involved with a research project at the request of the Dutch national association, KNVvL, looking into the effects of spiral dives on the pilot and the correlation between descent rate and G force. This led to the development of the Spiral Buddy, a small parachute that differs from the Ozone Anti-G in several important ways.

The Spiral Buddy was conceived as a safety aid for use in teaching spiral dives on SIV courses. It is stored in a small deployment bag and attached via a bridle to the carabiner on the opposite side to which the glider is to be spiralled. It can also be attached to the rear riser of paragliders which are known to accelerate/lock-into a spiral dive. A weight is held in the pilot's hand, again the opposite hand to the spiral.

If the pilot loses consciousness in a spiral dive, his grip on the weight (which, due to G force, is now 3 - 4 times as heavy) is released. As the weight drops it releases a

pin which opens the parachute container, allowing the Spiral Buddy to deploy. This immediately recovers the glider from a spiral, even if it is locked in. Two years ago in Olu Deniz I tried this system while it was still in the prototype stage. It certainly worked, and development has continued since. The Spiral Buddy is to enter production later this year. For further information contact info@actionairsports.nl.

Another interesting device is the Extractor Automatique de Parachute de Secours (EAPS), developed and tested in France by Norbert Barboux and Hubert Chrétien. This ingenious system comprises spring-loaded, front-mounted reserve parachute containers which can be triggered by the instructor via a remote control unit, or manually by the pilot. It is compatible with most reserve parachutes and has been tested to the EN12491 Emergency Parachute standard.

The remote control unit, operating on secure private frequencies, can control up to eight deployment containers with a range of 4.5km. All components are seawater-proof and can be reinstalled by a competent parachute packer.



The Extractor Automatique de Parachute de Secours (EAPS) from Hubert Chrétien and Norbert Barboux at Envol Mécanique

PHOTO: BASTIENNE WENZEL/THE RISER

Most reserve parachutes are compatible with the container (and are not included in the price). This system has the potential to be used for all aspects of SIV and Acro training, not just spiral dives. The units are re-usable and have a lifespan of ten years with a bi-annual service schedule.

All the research, development and testing that has gone into this system means it isn't cheap - for us to equip an average SIV group with deployment containers and remote-control units would cost somewhere in the region of £20,000. We are currently in communication with Norbert Barboux and hope to be able to test and evaluate this system in Turkey sometime soon. For more information go to www.envol-mecanique.com.

Conclusion

The spiral dive problem is still very much with us. It is reassuring to see the diversity of techniques and equipment being developed, and also the changes in certification, but the pilot must also take responsibility for his or her own safety.

- Before you buy a new (or used) paraglider, have a good read through the certification reports. You can easily find out how your glider performs in spirals (and all other manoeuvres) and what its maximum descent rate is. Most paraglider manufacturers publish certification tests on their websites, or check www.paratest.com or the DHV website.
- Make sure that you are fit to fly.
- If you want your glider to conform to its test results, fly with a similar harness to that used in certification with the same settings.
- If you choose to fly with a pod harness or stirrup be aware of the consequences. As far as we are aware, no glider has ever been certified with a pod harness.

Escape (www.jockysanderson.com) provide UK EP and CP training, overseas guiding, SIV and XC training and Jocky Sanderson's superb "Security in Flight II" DVD.