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SAFETY NOTICE

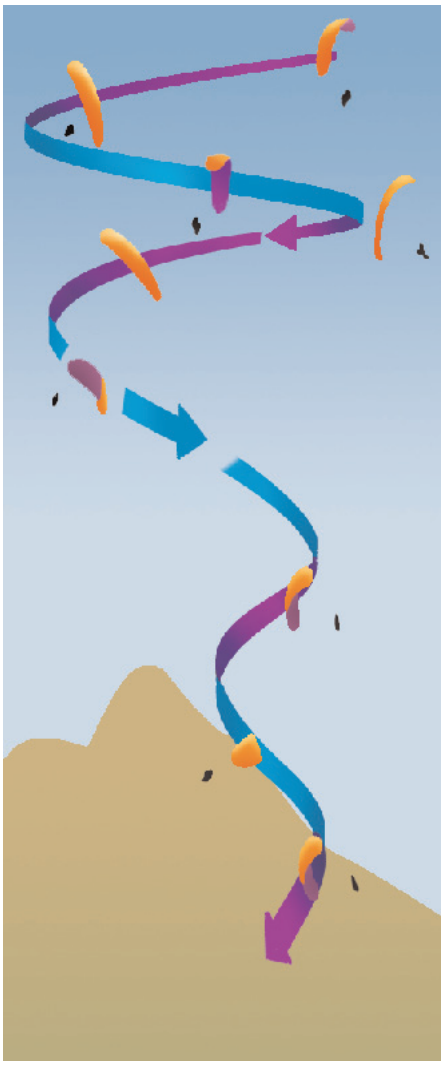
Issued by Angus Pinkerton - Chairman of the Flying & Safety Committee 21November 2008.

All paraglider pilots, Instructors, Coaches and Safety Officers must READ, DIGEST AND TAKE ACTION on the contents of this Notice and keep it for future reference.

If you hold a copy of the BHPA Technical Manual this notice must be inserted into it and retained until it is withdrawn or superseded on instructions from the Chairman FSC.

PARAGLIDERS: 360 DEGREE TURNS AND NOSE-DOWN SPIRAL DIVES

Following some recently reported incidents prompting further investigation, it has become apparent that it is possible for pilots to unintentionally enter a nose-down spiral dive from a sustained 360 degree turn – and that recovery from this spiral can be difficult. These characteristics tend to be worse on the 'safer' low aspect ratio EN A, B, LTF (DHV) 1 and 1 / 2 wings.



A 360 turn allowed to develop into a nose down spiral

Once in a nose-down spiral dive extremely high rates of descent – 14 to 27 m/s (approximately 30 to 60 mph straight down) may be reached, along with forces of 3g to 4g and airspeeds of up to 100km/h. Clearly any pilot inadvertently entering a nose-down spiral will find all of the above extremely disorientating. Whereas in most situations a low aspect ratio wing (EN A, B, LTF (DHV) 1, 1 / 2) will 'self-recover' if the pilot lets up on the controls, this is not the case in a nose-down spiral. Reaching and activating an Emergency Parachute may also be difficult whilst subject to high 'g' forces.

360 turn / Spiral dive mechanism:

If a 360 degree turn is continued for a revolution or two, without the airspeed and bank angle being controlled, then the pilot will tend to swing out. The situation can then accelerate rapidly. The effective pilot weight increases as centrifugal force increases, which increases the wing loading, which increases the airspeed, which increases the centrifugal force etc.. And as the pilot swings out, the pitch/roll/yaw axis of the paraglider tilts, with the result that the yaw resulting from holding on inside brake now brings the nose further down, whilst the secondary effect (roll) keeps the glider rotating on the downward vertical corkscrew path.

Continued overleaf .....

Instructors and Coaches should brief students and pilots in their care on the dangers outlined above – especially if teaching 360's, thermalling and ways of losing height before commencing a landing circuit. Students and pilots should be briefed when 360ing that 30 degrees of bank angle is more than sufficient. The correct technique for normal 360ing is

to establish the turn using inside brake and weightshift and then, keeping these constant, to control the turn with outside brake so that a steady bank angle, airspeed and rate of turn is maintained. Initial 360s should be practised one at a time, then two at a time, and so on.

Normal angle of bank for 360 turns.

Pilots should avoid tight, high speed 360's. 30 degrees of bank angle is more than enough for normal flight manoeuvres, including thermalling. The correct technique for a 360 turn is to establish the turn using inside brake and weightshift and then, keeping these constant, to control the turn with the outside brake so that a steady bank angle, airspeed and rate of turn is maintained. Particularly when you are learning 360s, whilst maintaining a good lookout, be aware of the horizon in the background and keep your inner wingtip at least 20 degrees above it (20 degrees is the width of two fists held at arms stretch) – the straight ahead view should be similar to that shown in the illustration. Use the controls as necessary to maintain a steady bank angle and airspeed. Your first 360s should be carried out one at a time, before linking them two at a time, and so on.

Emergency Actions: Getting out of a nose-down spiral dive

The key first step is to slow the glider by applying both brakes. Considerable force may be required on the controls to do this – the brake pressure required may be two, three or four times normal. As the glider slows the nose will come up. Then it is important to keep the glider turning: completing another, wider, circle in the initial direction (by raising the outside brake) is a good way of dissipating the energy. Avoid exiting immediately to straight flight as you will have considerable airspeed and energy, and this will result in a surging climb followed by a dive which must be 'damped' out to prevent a possible collapse.

Nose-down spiral dives are a potentially dangerous manoeuvre and should be treated with a great deal of respect. They are however a valid emergency rapid descent technique for those who are in current practice with their use – but recovery should always be completed at least 300m (1000ft) above ground level. Pilots should seek skilled instruction before attempting this manoeuvre, on a course conducted in accordance with the BHPA SIV Course Information Sheet.