PARACHUTES

The BGA Safety Team discusses the choice, maintenance and use of emergency parachutes

For the most part, UK and EU aviation authorities regard your emergency parachute as a personal, carry-on item in the same category as your spectacle case or lunchbox [1,2]. There is no requirement for regular maintenance or inspection [3], only a loose performance standard [4,5], and no need to register ownership. Indeed, unless you fly in cloud [6] it is up to you whether you fly with a parachute at all.

While most glider pilots will never use their parachute as more than a seat cushion, our 50-year records show that 39 UK glider pilots have returned to earth alive under emergency parachutes after problems aloft. Six of these pilots baled out with control or rigging problems, 10 with structural failure or suspicion thereof, and 23 following a mid-air collision. For these pilots, the parachute was an aircraft, and they owe their lives to its airworthiness.

A similar number of pilots contemplated baling out or should have considered this option. These included one who died when his damaged tailplane later failed, and one who was lucky to receive only minor injuries after descending without pitch control from 2,000ft. Three pilots, who subsequently suffered fatal or serious injuries, must have wished they had carried parachutes when collision or control failure rendered their gliders unflyable.

DEPENDABILITY

The rectangular or elliptical ram-air canopies used for sports parachuting and displays are intended to be deployed from a stable free-fall position, and to allow precisely controlled descent to a held-off landing. In contrast, emergency parachutes are usually circular and are designed to operate with minimum loss of height, and to do so reliably even if the pilot is tumbling out of control. They can snatch abruptly enough to leave bruises, and the landing can resemble a jump from a shed roof, but they are reliable and can be controlled enough to steer into wind and away from dangerous obstacles. In principle they can operate from as low as 300-500ft, although the height lost in vacating the glider means we have no records of successful use following a collision at or below circuit height.

While there have sadly been pilots who were too low, too injured or otherwise unable to bale out of damaged gliders, our records show that every pilot who escaped from the cockpit and pulled the parachute ripcord at sufficient height survived. While three pilots suffered leg or back injuries, the rest incurred little more than minor cuts or bruises as results of their parachute descents.

VARIETY

Several manufacturers produce emergency parachutes for glider pilots and aerobatic powered pilots. Many have military clients, and most have Technical Standard Order approvals [7]. These manufacturers offer a range of canopy sizes, pack shapes and harness types, and a variety of other options and accessories. All designs follow the same principles, although the drogue and main canopy deployment mechanisms can vary.

Most emergency parachutes have round canopies measuring 7-9m in diameter. The vertical speed depends upon the canopy size and pilot weight, with quoted values from 8-16mph. Larger pilots may wish to choose one of the larger canopies, though this will also mean a slightly thicker pack.

Parachutes also vary in pack type and size: most glider pilots opt for a back pack, but chair and seat versions [8] position some or all of the pack beneath the seated pilot and tapered packs move it higher up. The best arrangement will depend upon the pilot and glider, and should ideally be comfortable, provide lumbar support and leave space for an energy-absorbing cushion [9] while still allowing adequate headroom. Some companies can customise packs to personal requirements.

'Aerobatic' buckle positions may be more comfortable beneath the seat harness [10], and there are differences in harness adjustment and D-ring location. Options such as quick-release buckles, lumbar supports and back pads are sometimes available.

YOUNG PILOTS

We know of no parachutes specifically designed for children. While manufacturers rarely specify a minimum pilot size or weight, harnesses must allow enough adjustment to fit the pilot securely. If a child is too small for a parachute harness, the seat harness may also be unsatisfactory [11]. In use, very light pilots might experience slightly slower parachute deployment.

Pilots should have the strength, reach and wherewithal to bale out if circumstances require it. Young, infirm or impaired pilots might lack this ability, which could in turn affect the willingness of the pilot in command to abandon the glider [12].

BALING OUT

The decision to bale out will depend upon your assessment of the glider's integrity and controllability, bearing in mind the intrinsic fragility of the aft fuselage and tailplane [13]. In most cases, you'll want to get out as quickly as you can. The glider's gyrations may make it difficult to do so, but it may be possible to stabilise the glider temporarily, manoeuvre it to help you leave, or to slow its descent using airbrakes or tail-chute.

The first action will be to jettison the canopy: make sure that you're familiar with its operation during your pre-flight checks. Equipment cables are believed to have fatally impeded exit after a mid-air collision in 2006 [14], so ensure any canopy-mounted devices have breakable connections.

Then get out of the glider. There are no rules for this – who knows what state the glider will be in? – but the IGC has compiled some excellent guidance [15] and G Dale's baleout talk [16] contains much good advice.

Look down to locate the ripcord D-ring and pull it with a sharp tug once clear of the aircraft. To avoid undue resistance, pull along the extended line of the ripcord guide-tube. The pilot chute should deploy immediately, and the main canopy should be fully inflated within 2-3 seconds [17].

STEERING AND LANDING

The parachute may be steered by pulling the rear risers down by 15-30cm on the side towards which you wish to turn. Some parachutes have toggles attached to the risers for convenience. Steer to avoid obstacles and hazards and aim to end up pointing roughly into wind. If landing in trees or shrubs, keep your legs together and cross your arms to protect your face and torso. Land with your legs together and slightly bent, and your feet pointing to one side of the landing direction so that you roll onto your side [18].

CARE AND MAINTENANCE

Your parachute, like any aerial conveyance, needs to be treated with care and attention. Keep it clean, store it in a dry, heated place away from sunlight, and avoid contact with oil, grease, liquids and sharp edges. Do not place it on the ground, which can be damp and abrasive.

A daily inspection should check your parachute's general state, including harness stitching, any signs of moisture and damage to the pack fabric, and the condition and operation of buckles and adjusters. Check that the pins are straight and properly seated behind the (usually Velcro-secured) panel, the pins and ferrule are securely swaged to the ripcord, the ripcord moves freely, and the D-ring is securely seated in its pocket. The manufacturer's manual will give full details.

Several pilots have found that the loose ends of parachute straps can become lodged within glider seat pans, hindering emergency evacuation. Your harness should have sleeves or keepers to hold the strap ends securely out of the way. Be sure to replace any that are perished or missing.

Most manufacturers recommend that parachutes undergo a full inspection and re-pack every 6-12 months, though in the UK this is not a legal requirement. The inspection should examine the condition of the canopies, rigging lines, harness and deployment mechanisms, including any rubber parts that may need replacement.

‘ EVERY PILOT WHO ESCAPED FROM THE COCKPIT AND PULLED THE PARACHUTE RIPCORD AT SUFFICIENT HEIGHT SURVIVED ’

Unlike in the USA, there is no formal certification of emergency parachute riggers in the UK, but an experienced rigger will usually have undergone training by one or more of the major manufacturers. A rigger used to packing ram-air canopies for sports parachuting may have little experience with round emergency parachutes.

Most manufacturers specify a lifetime of 20 years in normal gliding use – a letter from Irvin outlines the logic for this [19]. There is no legal reason in the UK not to extend the parachute's life ‘on condition’, but riggers are often uncomfortable about their liability if they do so, especially without access to proper facilities for testing under load.

As there is no registration of ownership, you will not be notified of Airworthiness Directives affecting your parachute, so you should check these periodically through the CAA, EASA, FAA and manufacturers' websites and the BGA Compendium [20] – your glider inspector should be able to help with this.

PRACTICE AND PREPARATION

In most situations that call for the use of an emergency parachute, you're likely to be startled, scared, befuddled and indecisive. Mental preparation and regular practice of procedures on the ground can be helpful.

Think through the considerations and physical actions before flight and arrange a hangar exercise to practise them: with some helpers to take the glider canopy and a mattress to fall onto, this can be relatively realistic. Read through the manual that comes with your parachute.

With confidence in the quality, condition and operation of your emergency parachute, you'll then be as prepared as you can be to use it should it be needed.

Tim Freegarde and the BGA Safety Team

[1] BGA, Managing Flying Risk – in-flight equipment *https:// tinyurl.com/flyright2501*
[2] EASA, How shall I maintain my certified emergency parachute? *https://tinyurl.com/flyright2502*
[3] In the USA, however, regular inspections are required
[4] EASA, ETSO-C23d (2003) *https://tinyurl.com/flyright2503*
[5] SAE, AS8015b (1992) *https://tinyurl.com/flyright2504*
[6] BGA, Operational Regulations *https://tinyurl.com/flyright2505*
[7] EASA, Parachute approvals under EASA responsibility (2008) *https://tinyurl.com/flyright2506*
[8] Butler Parachutes, How to select an emergency parachute *https://tinyurl.com/flyright2507*
[9] *Cockpit remedies, S&G* (Dec 2020/Jan 2021) *https://tinyurl.com/flyright2508*
[10] Safety Briefing: GQ parachutes *https://tinyurl.com/flyright2509*
[11] BGA, Mandatory safety and medical information (2024) *https://tinyurl.com/flyright2510*
[12] BGA, Lessons and Disabilities *https://tinyurl.com/flyright2511*
[13] BGA, Parachuting after a mid-air collision *https://tinyurl.com/flyright2512*
[14] AAIB, HGM and GDP (2008) *https://tinyurl.com/flyright2513*
[15] IGC, Emergency glider evacuation *https://tinyurl.com/flyright2514*
[16] G Dale, Bailing out of a glider *https://tinyurl.com/flyright2515*
[17] Pure Glide, How emergency parachutes can save your life *https://tinyurl.com/flyright2516*
[18] NZPIA, General use & care of emergency parachutes *https://tinyurl.com/flyright2517*
[19] BGA, TNS 3/4/77 *https://tinyurl.com/flyright2518*
[20] BGA Compendium – Equipment *https://tinyurl.com/flyright2519*

■ All previous ‘Fly Right’ articles are available from the *S&G* website. See: *www.sailplaneandgliding.co.uk/safety-articles* which may be accessed using the QR link below.