

SAFE



WINCH LAUNCHING

This guidance has been developed from the BGA's Safety Initiative winch launch accident study. It should be used in conjunction with Chapter 16 of the BGA Instructors' Manual.

The advice contained in this leaflet and in the accompanying notes highlights the key risk areas in winch launching and offers simple but effective guidance on how to minimise these risks.



GUIDELINES FOR AVOIDING THE MAIN HAZARDS OF WINCH LAUNCHING

Truncated advice such as this is necessarily simplified.

Site-specific factors may require many other considerations; however, the key points listed, if rigorously applied, should help to prevent many sad and unnecessary winch launch accidents.

Pilots should consider the following hazards before every winch launch:

STAGE	HAZARD	AVOIDANCE
Ground Run	Wing touches the ground, glider cartwheels or ground loops violently.	<ul style="list-style-type: none"> • Start the launch with your hand on the release. • If you cannot keep the wings level, release immediately.
Rotation	Stall/spin during rotation.	<ul style="list-style-type: none"> • Avoid taking-off with a significant amount of yaw present. • Delay rotation until adequate speed is seen and continuing acceleration is present. • Ensure the transition from level flight at take off to a 40° climb is controlled, progressive, and lasts about 6 seconds.
	Stall or heavy landing after launch failure below 100ft.	<ul style="list-style-type: none"> • If the launch fails, immediately lower the nose to the appropriate recovery attitude at zero g. Minimising the reaction time is crucial. • Do not use the airbrakes until the glider has attained an appropriate attitude combined with a safe speed. • Instructors: simulated power loss with less than 50ft and 55kt by instructor demonstration only.
Climb	Stall, spin, or heavy landing, after launch failure.	<ul style="list-style-type: none"> • Adopt the recovery attitude; do not turn or use the brakes until the approach speed is attained. • Land ahead if it is safe to do so.
	Controlled flight achieved after launch failure but subsequent stall, undershoot, overshoot, heavy landing, or collision.	<ul style="list-style-type: none"> • Plan provisional circuit options before taking off.

Further Guidance...

(Numbers based on a glider with a stalling speed of 34kt)

Stall/spin/flick roll during rotation

A stall and possible spin/flick roll during rotation results from a low airspeed combined with a rapid rate of rotation. Accidents of this kind are rare but often fatal.

A low airspeed and a high rotation rate can arise through a too rapid rotation at low airspeed, or from a rapid rotation with an airspeed that was initially adequate but which reduces in the latter part of the rotation.

A glider with a 1g stalling speed of 34kt is likely to stall during rotation at about 50kt if the rotation rate is 20° per second.

The suggested 6 seconds for rotation to a 40° climb angle implies an average of around 7° per second and a maximum of perhaps 10° per second. At this rotation rate the stall speed will be about 44kt.

- Do not take off with the stick held back. Never pull back to initiate rotation unless you are flying one of the few types that requires it.
- Reduce the rate of a rapid rotation if the airspeed is decreasing.

Launch Failure below 100ft

The most common winch launch accident is trying to land ahead after loss of power. In 80% of these accidents the power was lost below 50ft. Nearly half the accidents occurred below 25ft. The majority of the gliders stalled but about a quarter of them hit the ground nose first, unstalled.

A safe recovery from power loss below 100ft requires sufficient energy, and the avoidance of a stall. The height and the airspeed determine the available energy. The angle of climb, the airspeed, and the delay before lowering the nose to the appropriate recovery attitude determine whether the glider stalls.

It is suggested that the minimum desirable surplus energy should be that which permits a round out at ground level at 55kt. This energy is achieved with about 55kt at 20ft or 50kt at 50ft. Adequate surplus energy can be achieved by delaying rotation until the minimum launch speed is attained and continuing acceleration is present.

It is imperative that the glider is not allowed to stall. If power is lost in a 25° climb at 50kt and pushover to a recovery dive is delayed for 1.5 seconds the airspeed at the beginning of the recovery dive will be at the stall speed of 34kt.

Minimising the reaction time is crucial.

- Pushover g should be about zero. A recovery dive angle of 5° hardly allows acceleration but may be necessary at a few feet. For acceptable acceleration with minimum height loss when near the ground, not stalled, and in the absence of a wind gradient, the suggested recovery dive angle is about 15°. Increasing the dive angle from 15° to 30° typically consumes an extra 40ft of height.

- Instructors should never surprise a student with a simulated cable break below 100ft because delay in pushing over, pulling the nose up, pushing the nose down too much, confusion, wind gradients, and other adverse circumstances can make a crash inevitable.
- Demonstrations of recovery from power loss below 50ft should be by a pre-arranged reduction of power.

High speeds

There is no case of an airworthy glider being damaged by excessive airspeed on a winch launch which is why it is not listed as a hazard. The placarded maximum winch launch speed may safely be exceeded during the early part of the launch.

- If the speed is excessive near the ground, climb gently to several hundred feet and release. Releasing below 100ft could be hazardous, not least from hitting the cable. Signalling could overstress the tail. Pulling back to control the excessive speed may break the weak link leading to a difficult recovery.

And of course, before flying any new type for the first time, read the flight manual and obtain a full briefing. Some gliders may have characteristics which differ from the "norm" and therefore require particular attention.



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BGA Safety Initiative, October 2005 - Any queries or questions should be referred to safetyinitiative@gliding.co.uk or to the BGA office in Leicester

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