Incident

Aircraft Type and Registration:	Tug	Super Cub	G-BJCI
	Glider	Lak – 12	G-DHSR
Engine type:	Tug	1 x LYCOMING O-360-C2A (SENSENICH 76EM8-0-52)	
	Glider	None	
Year of Manufacture:	Tug	1958	
	Glider	1995	
Date and Time (BST):	23-05-15 12:28		
Location:	200m NNW Millfield Airfield		
Persons on Board:	1 on each aircraft		
Injuries	None		
Nature of Damage	Aerotow cable severed		
Commander's Licence	NPPL (Glider Pilot Licence Conversion)		
Commander's Age	37		
Commander's Experience	95 hours total, 65 hours as P1 and 22 hours on type		
	Last 28 days 1:40 Note: 885 hours as a glider pilot		
Glider Pilot Licence	BGA Silver C; BGA Assistant Rated Instructor		
Glider Plots Age	62		
Glider Plot Experience	650 hours		

Synopsis

A glider was being launched via aerotow from Millfield Airfield. Shortly after the aerotow combination crossed the airfield boundary, the glider on tow climbed significantly above the tug aircraft which lifted the tail of the tug until it was pointing at 45 degrees nose down. The tug pilot operated the aerotow cable guillotine on the aircraft and recovered to normal flight; the glider pilot initiated a turn and returned to the airfield.

Both aircraft landed safely; notably, this was the third incident of this nature at the club in a three and a half year period.

History of the flight

This was the second flight of the day for the glider pilot, having not managed to soar successfully during his first flight. The weather conditions were good with visibility > 10Km, 4/8 cloud cover, the wind 290° 5Kt and runway 29 was in use. The club was operating two tugs simultaneously, a Eurofox for all but the heaviest two seat gliders and a Super Cub. The glider a Lak 12 G-DHSR was lined up to take off behind the Super Cub G-BJCI. Information gathered via the club safety officer informs that this seemed to be a rushed process with self-induced pressure to take off. The glider pilot clearly recalled carrying out his checks and the combination took off without incident, on crossing the airfield boundary at 200' agl, the glider pilot encountered some turbulence and realised his canopy was unlatched, he immediately held on to the canopy to keep it closed, but whilst the pilot was distracted doing this the glider became significantly out of position above the tug. The glider pilot advises he operated the tow release as soon as he realised the tug was out of sight below, but as he operated the release also felt the cable back release, which aligns with the tug pilot's account of guillotining the tow cable. The tug pilot advises he experienced a smooth take off and accelerated from 60kts to 70kts as he crossed the airfield boundary. Whilst initiating a gentle turn to avoid the village of Millfield (Photo 1) he experienced the tail of the tug starting to be lifted, this continued very rapidly overpowering elevator authority until he judged the tug aircraft was in a steep nose down attitude. The tug pilot immediately operated the aerotow guillotine twice to release from the glider, there was insufficient time to initiate a warning radio call. On the second firm pull, the guillotine severed the aerotow cable and released the tug from the glider. The tug pilot initiated an immediate recovery from the dive and clearly recalls bottoming out of the dive at a height noticeably below the nearby pylons (180'). Both aircraft subsequently made a successful recovery to Millfield airfield (Logger detail - Photo 2).

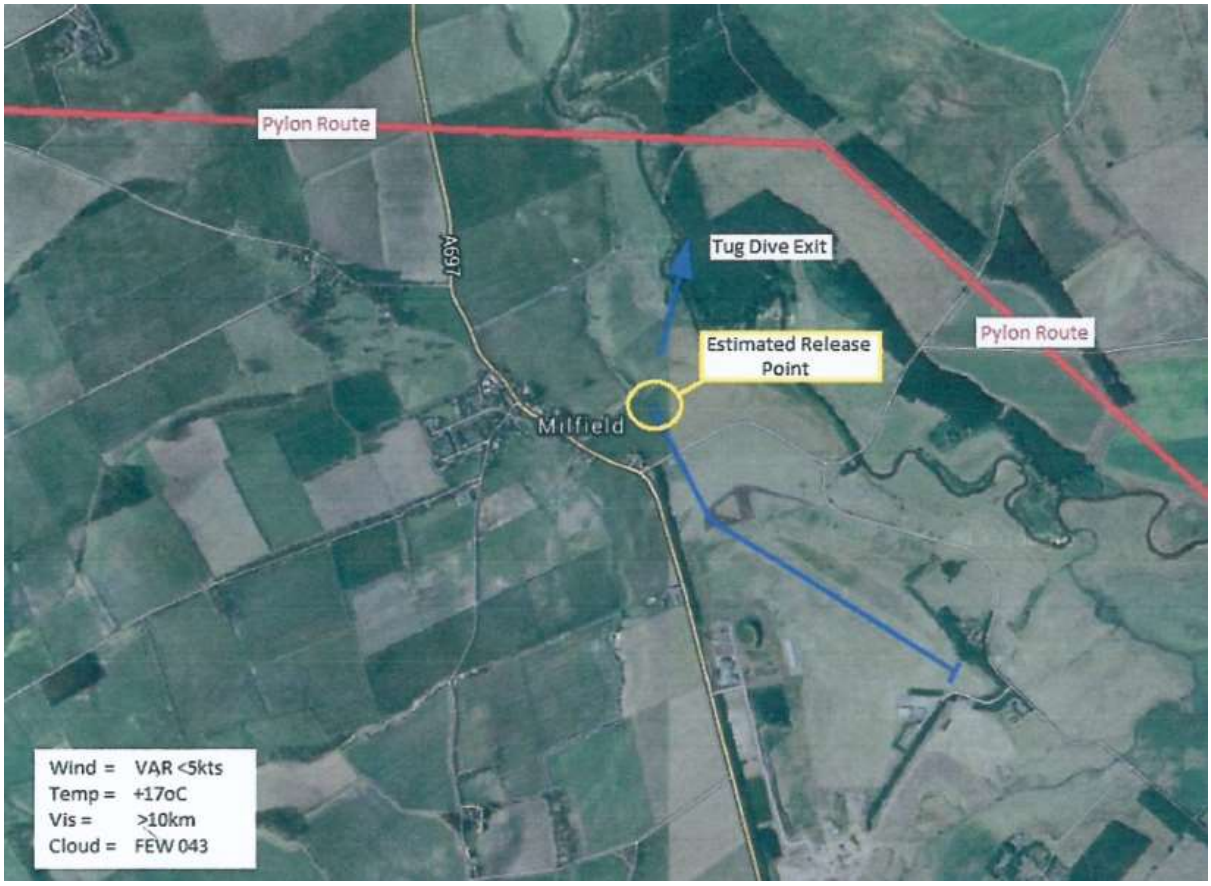

Photo 1

Photo 2

Root Cause

On landing no fault was found with the glider canopy locking mechanism and it is believed that the glider most probably took off with the canopy unlatched. Notably, the glider pilot was keen to 'relight' after an unsuccessful soaring flight and was eager to get ready to depart behind the tug. Whilst the glider pilot clearly recalls conducting his pre-launch checks, his desire to relaunch caused an ommision to occur whilst conducting his pre-launch checks in that he states he did not check the security of his canopy. It was the insecurity of the canopy that was responsible for the momentary loss of attention in maintaining position during the aerotow. As the glider was only equiped with a C of G release hook, the pitch up effect on the glider at 70 Kts will have been more rapid than a nose hook and have caused a rapid 'kiting' of the glider in relation to the tug who would have suffered the corresponding pitch down. Given the speed of events due to the rapid pitching, there was nothing that the tug pilot could have done at an earlier stage and his prescence of mind undoubtedly averted a serious accident as recovering from the dive below 180' at > 70Kts implies that had the tow combination taken a further 2 seconds to release, the tug would have impacted the ground whilst attempting to recover.

The root cause of the incident was the glider pilot not having completed his pre-launch checks correctly, then becoming distracted by an insecure canopy with the loss of position outcome potentially being exacerbated by the glider being towed via a C of G release.

This was the third incident of this nature at the club, the SRE discussed the incident with the pilots concerned and the club Safety Officer specifically requested a BGA review and investigation.

Recommendations

1. The BGA engage with its member clubs to review their launch point operational routines and procedures to reduce the risk of a culture of self-induced and un-necessarily hurried pressure to launch arising at the launch point.
2. To raise pilots' awareness that immediatley prior to launch is one of the most critical parts of the flight and to be completely prepared and in the right frame of mind prior to launch.
3. Following a noticable increase in aerotow launching at many clubs, especially following the introduction of lightweight and more economic tug aircraft, the BGA raise the awareness of it's 'Safe Aerotowing' initiative. During investigation it was clear that almost all pilots were aware of the 'Safe Winch Launching' initiative but that this was a far lower number when questioned about the similar aerotowing initiative.
4. The BGA continue to recommend the retro-fitment of nose hooks to gliders where such a modification is feasible and affordable. Where such action is not possible that the BGA continue to bring the attention of owners factors which enhance the risk and the measures that can be taken to mitigate the risk to reasonable levels.

Recent BGA Advice on Aerotowing

2014 Accident Review

Tug Upsets

There were two tug upsets in 2014. One was at 50ft and caused the tug to hit the ground in a 45° dive.

In a vertical tug upset the glider gets high behind the tug and the tug nose is forced down. The slingshot vertical upset is particularly dangerous. If the glider pilot is low in relation to the tug and the pilot moves back into position too quickly the glider in effect does a winch launch behind the tug which tips the tug into a vertical dive.

The BGA published a leaflet on safe aerotowing in 2013.

Do you have a copy of this leaflet? If not, please obtain a hard copy from your club or download a copy from the BGA website at:
http://www.gliding.co.uk/safeaerotowing

The boxed guidance indicates how to keep safe on an aerotow:

If you are inexperienced, do not aerotow on a belly hook and do not aerotow in turbulent conditions.

Maintain the correct vertical position of the tug in the canopy. Do not allow the glider to get too high.

If you are too low behind the tug shortly after the tug take off, or at any other time, move back into position SLOWLY. Being lower than the tug is not dangerous. An upset can follow if you pull up quickly.

Release immediately if the glider is going high and the tendency cannot be controlled or you lose sight of the tug.

Fly the glider! Leave any potentially distracting problems with instrumentation or ventilation until after release. Leave the undercarriage down.

At release height, is it clear? Pull the release, visually ensure the rope has separated from the glider, and raise the nose slightly before making a turn.

Photograph courtesy of Pete Benbow

11

5. Tug Upsets

Three tug upsets were reported in 2013. In the most serious incident the tug nose was tipped down at 100-200ft. The tug pilot guillotined the rope and was able to pull out of the dive at 40ft agl. Another upset was caused by the glider pilot pulling the trim lever to release and turning without having confirmed the rope had separated. The third upset was lateral.

Guidance on safe aerotowing, with particular emphasis on avoiding tug upsets is available in the leaflet that was distributed to clubs in 2013 and which can be downloaded from the BGA website. The website also contains video simulations of tug upsets.

As a glider pilot on aerotow, employ the correct vertical positioning technique, give your full attention to flying the glider and, at release height, make sure the rope has detached before turning.

Glider pilots - do you need to refresh your aerotow technique?
Tug pilots - if you are losing control of the tug do not hesitate to dump the glider.
Please read the Safe Aerotowing leaflet and other information at www.gliding.co.uk/safeaerotowing

2. Tug Upsets

There were 6 known tug upset incidents in 2012. 5 were vertical upsets and one was lateral. Fortunately, no tug pilots were killed.

In a vertical tug upset the glider gets high behind the tug forcing the tug nose down. The slingshot vertical upset is particularly dangerous. The glider in effect does a winch launch behind the tug.

After a spate of fatal accidents some 30 years ago there was a BGA educational campaign to teach pilots how to aerotow safely. The frequency of tug upset incidents declined, with just two between 1996 and 2003. But tug upset incidents have increased in recent years with 17 since 2004, of which 6 were in 2012. Any of these could have killed a tug pilot. They were saved by the rope or weak link breaking, the rope back releasing, or the tug pilot or glider pilot releasing.

The incidents in 2012 are summarised below:

- glider turned without verifying that the rope had separated
- glider pilot trying to turn on master switch at 600ft, tug in 40° dive before tug pilot managed to release
- P2 struggling to maintain position at 1800ft, tug experienced nose down pitch and roll, tug pilot released (lateral upset)
- turbulent, tug nose pitched down, tug pilot released
- glider pilot attending to unlocked canopy, glider pitched up, glider pilot released
- glider pilot lost sight of the tug at 3-400ft, tail of tug pulled up, tug pilot released and just climbed away from the trees below

The circumstances which make tug upsets more likely are:

- belly or C of G hook intended for winch launching
- short rope
- pilot with little aerotow experience
- near aft C of G
- turbulent conditions
- all flying tailplane, or light elevator forces

Several recent tug upsets have been preceded by pilots attending to ventilation and instrument problems, by the use of incorrect technique for vertical positioning, and by pulling the release and turning without confirming that the rope had detached.

Simulated tug upsets, even at altitude, are very dangerous and hence do not form part of the training syllabus. Two series of simulations were conducted at altitude about 20 years ago, with a photographic chase plane, to understand the nature of a slingshot. This resulted in frightening experiences for the test pilots.

Some of the essentials for safe aerotowing are:

- If you are inexperienced
  - avoid aerotowing on a belly hook
  - do not aerotow when close to the minimum weight; ballast to at least 15kg more than the placarded minimum weight
  - avoid aerotowing in turbulent conditions
- Don't attempt to be TOO low in the period between the glider taking off and the tug becoming airborne. This risks bouncing, especially on grass airfields. The subsequent possible Pilot Induced Oscillation can lift the tug tail violently.
- Keep the glider in the correct vertical position by monitoring the position of the whole tug in the canopy; if the tug becomes high in the canopy, move back into position SLOWLY; if you move upwards rapidly a slingshot can result within a couple of seconds, putting the tug into a vertical dive.
- Fly the glider! Leave any problems with the instruments or ventilation until after release. Leave the undercarriage down.
- When releasing, make sure it's clear, pull the release, raise the nose slightly, check the rope has detached before turning.

When on aerotow, never pull up rapidly, employ the correct vertical positioning technique, give full attention to flying the glider, and make sure the rope has detached before turning.

Tug pilots should not hesitate to dump the glider if losing control of the tug.

SAFE AEROTOWING

Four tug pilots have been killed since 1974 from tug upsets while aerotowing. Six tug upset incidents were reported in 2012.

This leaflet offers advice to the glider pilot on safe aerotowing and in particular the avoidance of tug upsets.

BRITISH GLIDING ASSOCIATION