

BHPA Incident Analysis 2016 - 2018

Welcome to the 2016 – 2018 BHPA Incident Analysis report. It's been three years since the last analysis report, which allows comparison where appropriate. Where possible, as in the case of the line graphs, I have included previous years for continuity.

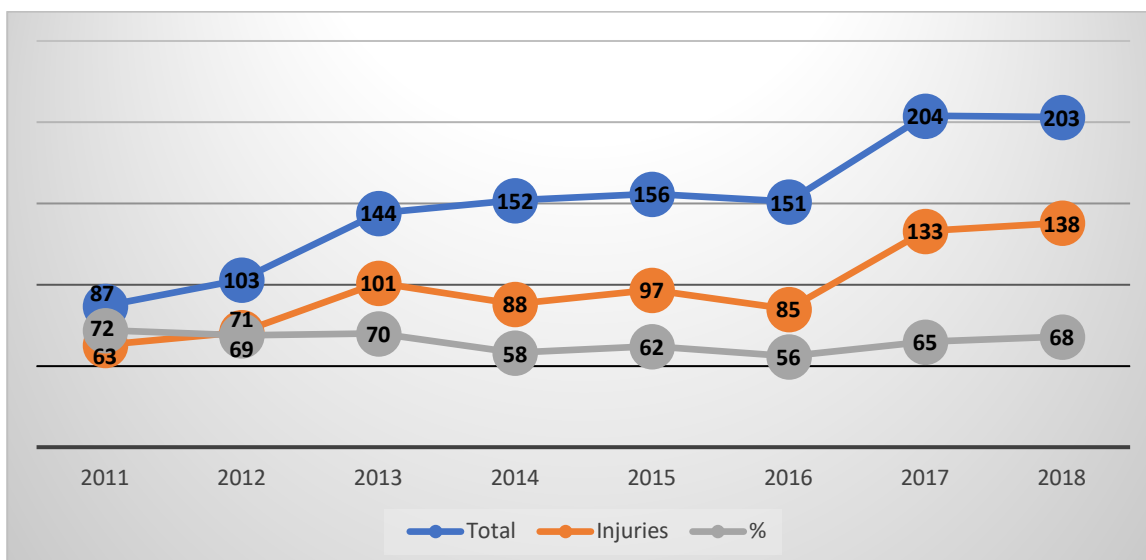
To save space and avoid unnecessary duplication the report does not contain any information about school incidents. The school data is presented separately to the schools and instructors. Those who are interested will be able to find the information on the BHPA web site in the next Instructor and Coach Newsletter.

As in previous reports, a few things to bear in mind whilst reading this one: Not all reports relate to injuries. Of the ones that do not involve injury, a proportion will be lucky escapes, equipment issues, damage to 3rd party property and things of that nature. The report focuses on Club Pilot and above but will also include some non-member data. Where possible (it isn't always) this will be highlighted. It's also worth remembering that the numbers and percentages will not always add up. This is due to the varied nature of the data. For example, the data contains information from both BHPA and non-BHPA pilots; and in a single incident a pilot may have more than one injury and there may be more than one causal factor, etc. etc.

The graphs focus mainly on hang gliding and paragliding (including paramotoring, towing and aerotowing etc.). This is simply because they are the disciplines where most of the incidents occur and there is enough data to display on a graph. This is the first year we will be including speed flying where possible.

The first graph shows the number of reported incidents for the last eight years. There has been a gradual rise over time with a more obvious step in the last two years. There could be a number of reasons for this but unfortunately they are all educated guesses. Firstly, the number of 'rated' paraglider pilots is increasing, as is the overall BHPA membership, currently at approximately 7500. Secondly, it is clear from the various XC charts that cross country activity is increasing almost year on year. In general, we appear to have more active pilots flying more days/hours than ever before. We are currently looking for a sensible way to put an accurate figure to the average number of hours flown by our members, but this is not as easy as it sounds. And thirdly, the reporting system is as easy to use as it ever has been. That said, there is still an element of non-reporting that needs to be addressed.

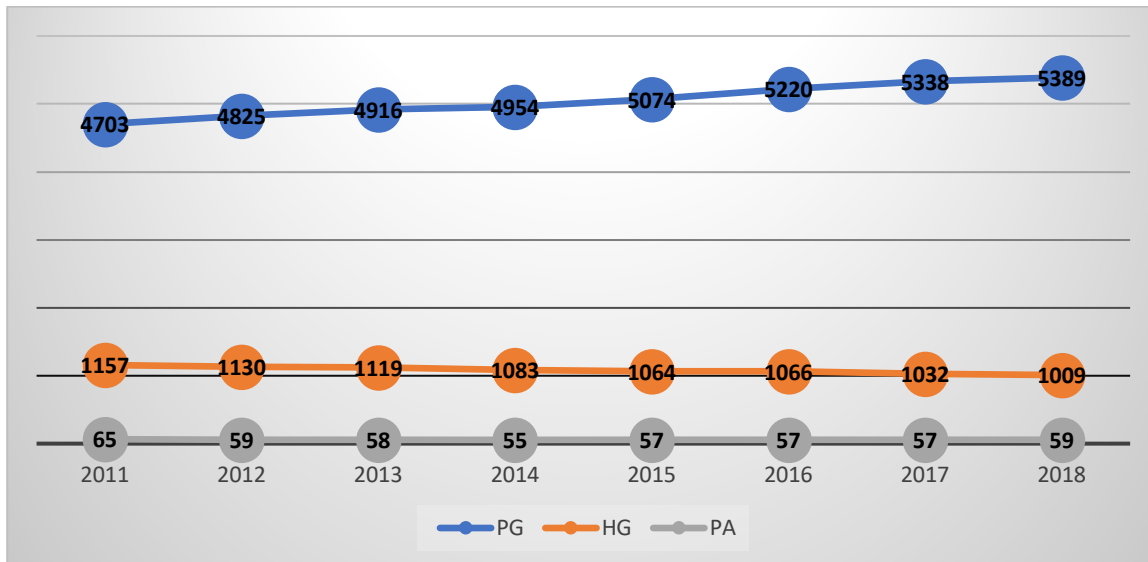
Total reports, injuries and percentage of injuries to total reports.



It's worth noting that though the number of reports has increased, the proportion of injuries to non-injuries has remained pretty constant.

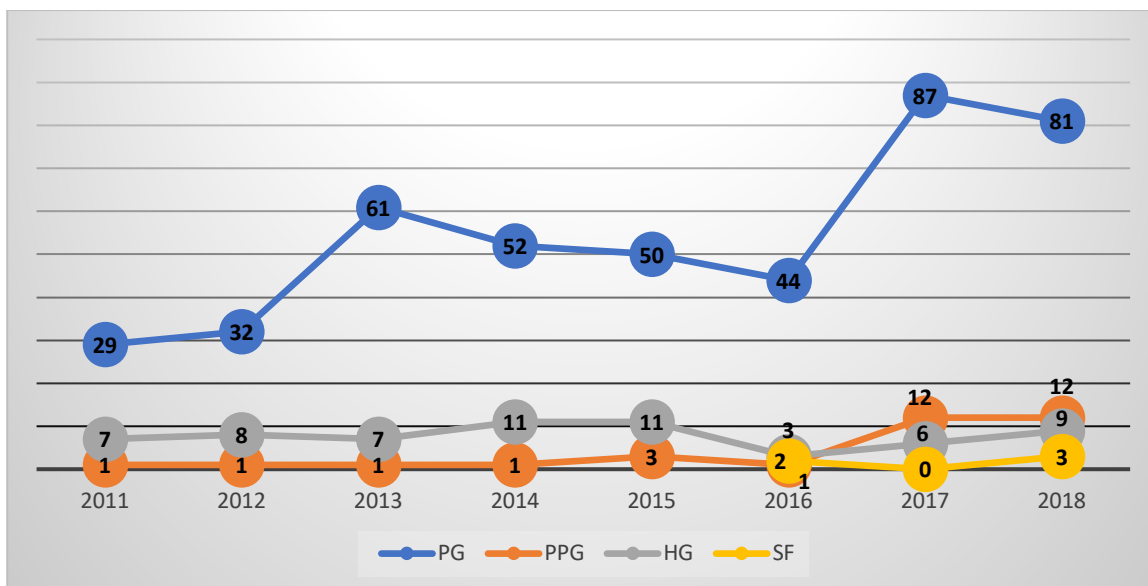
The following graph is simply to allow a visualisation of the membership numbers in relation to the number of reported incidents.

Total members with ratings



The next graph shows the number of reports that involved injury to pilots rated Club Pilot and above. The proportion of incidents appears to reflect the distribution of disciplines, apart from in the last two years where there is a disproportionate number of paragliding incidents. In 2011 there were approximately four paragliders for every one hang glider. In 2015 there were approximately five paragliders for every one hang glider. The current number is just over five paraglider pilots for every hang glider pilot.

Number of CP+ injuries by discipline (and environment)

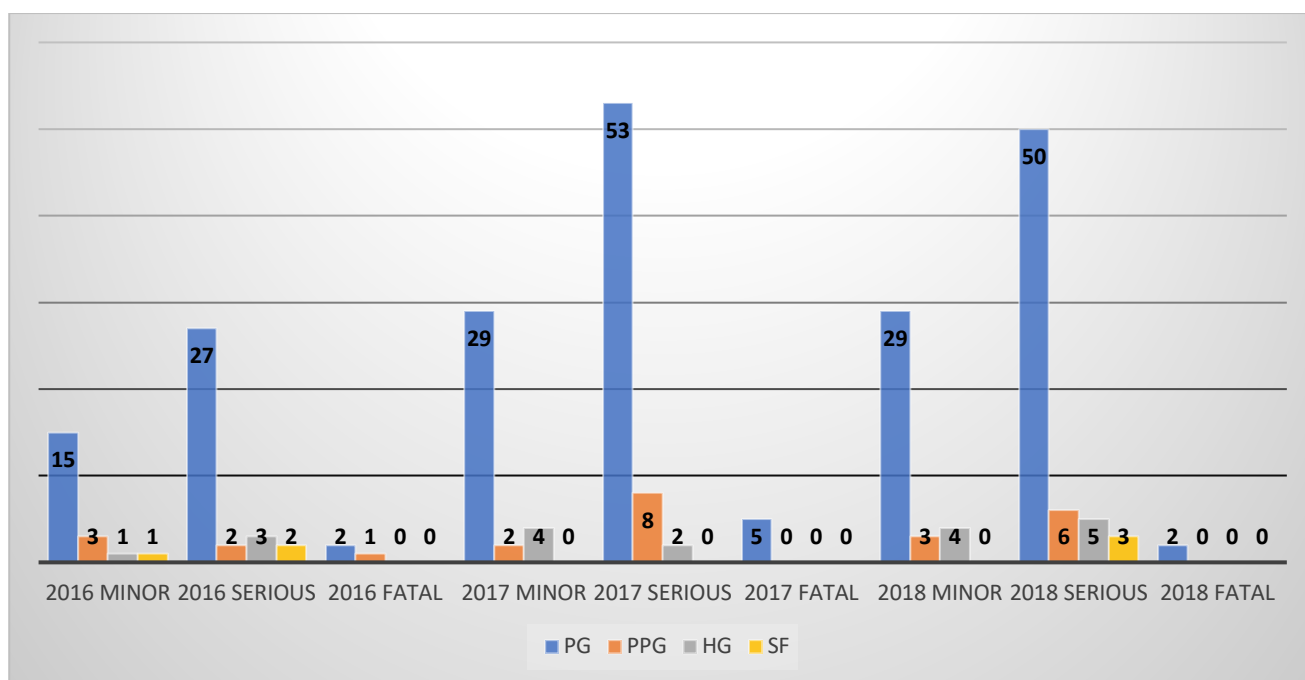


Now we look at the severity of the injuries and break them down into the most frequently occurring categories. It is important to note that the descriptions Minor, Serious and Fatal are

recognised EU terms for the purpose of air accident investigation. Not all 'Serious' incidents are actually that serious, e.g. a broken limb (including wrists and ankles but not fingers or toes) is classed as serious. There is quite a range within the term when comparing a fractured wrist to a badly damaged back or fractured pelvis.

We can clearly see the 2017 and 2018 increase in the amount of 'serious' paragliding incidents. There is also an overall increase in the number of paramotor incidents being reported though anecdotal evidence (and evidence from forum chat) suggests a significant proportion of PPG incidents are not being reported. Hopefully this will improve over time as attitudes to reporting change for the better.

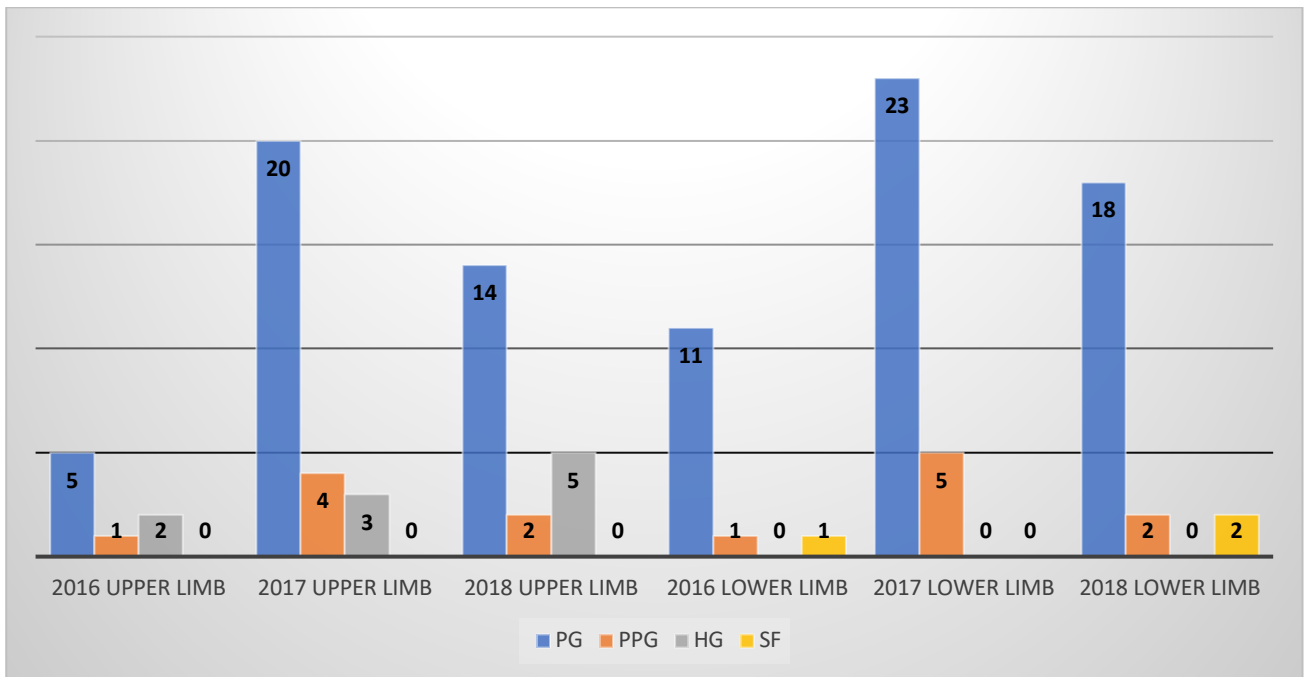
Severity of injuries



The following two tables show the breakdown of the serious injuries. In the past we've always mentioned head injuries. However, there are so few head injuries it is no longer necessary to include them. I'd like to think this is down to the sensible attitude of the pilots and the wide variety of properly tested lids available today. There's really no excuse to not be wearing a suitable, well fitting helmet now we've added the snow sport helmets (EN1077 class A, ASTM 2040 and SNELL rs98) to the list.

The three main areas of concern are upper and lower limb injuries and spinal injuries. Fractures of the arms, legs and spine are still the most common in our sport. The first table shows the upper and lower limb injuries for 2016 – 2018. As expected, and in line with previous years, the hang glider pilots tend to damage arms (usually as a result of forgetting to release the control frame on impact) and paraglider pilots tend to damage legs. That said, it is noticeable that the number of 'upper limb' injuries for paraglider pilots has increased in the last two years. The majority of the paragliding injuries are as a result of stumbling/tripping/losing balance on launch or landing, causing some form of minor fracture.

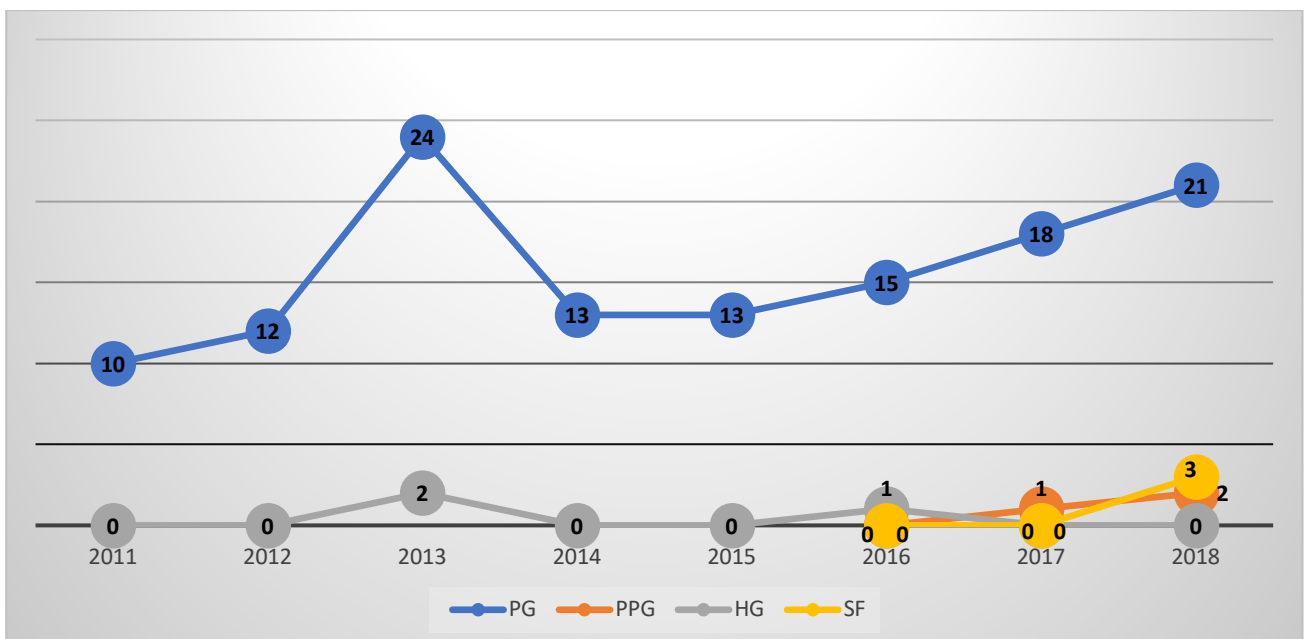
Breakdown of Serious injuries upper and lower limbs



I've separated off the spinal injuries, partly because there'd be too much info for one chart, and partly to draw attention to the numbers. Of the fifty-four 'serious' PG spinal injuries between 2016 and 2018, the majority involved low-level asymmetric collapses, resulting in an impact with the hill/mountain/ground. Mishandling the glider was a significant factor as was some form of misjudgement (misjudged the terrain, the wind strength, the wind direction, height above the ground etc. etc.), usually resulting in the pilot encountering air that was significantly more turbulent than expected.

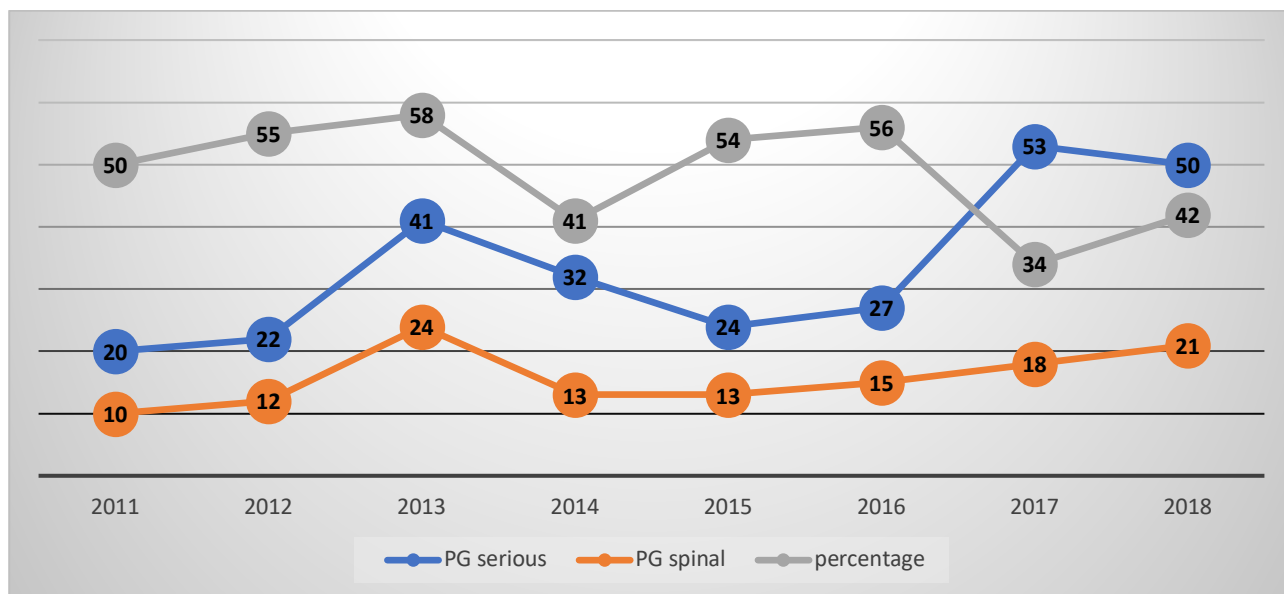
Luckily the majority are lower back compression injuries with pilots going on to make a good recovery. But even those you'd be better off avoiding!

Breakdown of Serious spinal injuries



Looking at the previous graph it would appear that spinal injuries are on the increase. However, it's worth looking at the serious spinal injuries in relation to the overall number of serious injuries. The following graph shows the percentage of PG spinal injuries. I'd be careful not to attach too much statistical significance to the numbers but clearly the proportion of spinal injuries has come down in the last two years. The reason for this is unknown as yet but let's hope the trend continues!

Serious PG spinal injuries percentage compared to overall serious PG injuries.



Causal Factors

The database has the facility to record the causes of the incidents and accidents. The table below shows a selection of the causal factors common to our incidents. The figures are, once again, very similar to those of previous years.

Human Factors	2011	2012	2013	2014	2015	2016	2017	2018
Pre-flight Check (omission)	1	8	8	15	15	12	16	3
Controlling Glider (error)	31	47	43	47	34	22	36	24
Poor Lookout	6	7	10	14	12	8	9	2
Environmental Factors	2011	2012	2013	2014	2015	2016	2017	2018
Unsuitable Site	0	2	1	8	3	15	20	9
Judgement Weather (error)	7	13	17	14	9	7	10	13
Judgement Orography (misjudging airflow around terrain)	16	18	29	11	15	28	43	21

According to the recorded data shown in the table, control errors and errors concerning the weather and air flow about the terrain are still the most common factors. More on this later.

The following table displays some of the stats not yet mentioned. The fatal incidents are approximately in line with our usual average of three per year. It is worth noting that nearly all of the fatal incidents involve the pilot flying in turbulent and/or thermic air and suffering a collapse of some description. The formal investigation reports for the majority of these incidents can be found on the BHPA web site under “Formal Investigations” in the Safety section.

The number of reported mid-air collisions has risen over recent years. Mid-airs can and do kill. Should you find yourself having a near miss (or a collision) you should have a serious think about the way you fly, and how you ensure a good look-out and maintain awareness of the other aircraft with whom you are sharing airspace. We have not yet encountered a mid-air collision where it has been found to be the sole fault of only one pilot. The other notable point is that of the 24 mid-airs that occurred between 2016 and 2018, six occurred on the South Downs. That is 25% of the total and 40% of those occurring in the UK! Something I’m sure the Southern Club is actively trying to address.

Regarding the parachute deployments, the figure in brackets shows the number of deployments reported from competitions. The lack of reporting of incidents in competitions has always been an issue but this is currently being addressed with more robust systems being put in place for the coming year.

With regard to the reported tandem incidents there were very few ‘serious’ incidents. With the few that did occur, it was invariably the pilot that sustained the injury though we have had one incident where the passenger was seriously injured. There was no obvious pattern.

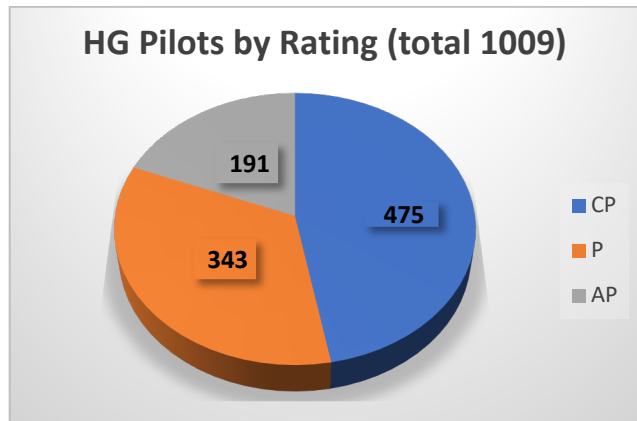
	2011	2012	2013	2014	2015	2016	2017	2018
Fatal Incidents	5 (3 HG 2 PG)	2 (1 HG 1 PG)	3 (3 PG)	1 (PG)	4 (3 PG 1 PPG)	3 (2PG 1PPG)	5 (PG)	2 (PG)
Parachute deployments	2 (0)	8 (1)	2 (0)	9 (3)	10 (2)	7 (1) (2 SIV)	9 (0) (2 SIV)	10 (1)
Mid-air collisions	2	2	10	14	12	5	7	12
Tandem incidents	1	3	3	5	6	7	5	6

There have also been eight fatal paramotoring incidents in the last three years that we know of, with six occurring in the last two years. Only one of the eight was a BHPA member (included in 2016 above). Two of the fatals involved mid-air collisions and one involved a pilot warming his engine while it was on the ground. Six of the eight involved pilots flying small gliders with very high wing loading, usually with a powerful engine unit. There appears to be a trend in paramotoring to move to smaller wings in order to fly faster. Wing loadings of 6kg/sqm are common and 7kg/sqm are not uncommon. To put this in perspective an Ozone Enzo 3 has a maximum wing loading of 4.7 to 4.9kg/sqm depending on the size of the wing. Normal paragliders in the EN-B category have a wing loading of approximately 4kg/sqm. High wing loading makes a glider fly faster, but also makes it more dynamic in response to both control input and reaction to turbulence. A canopy collapse at high speed and low altitude will be extremely dynamic, probably terrifying and almost certainly irrecoverable. Six of the eight PPG fatals involved wing loadings ranging from 6.6 – 7.7kg/sqm and all occurred at low level. It has been said that in paramotoring, due to reflex in the wing, “*the faster you fly – the safer you are*”. This is complete rubbish!!

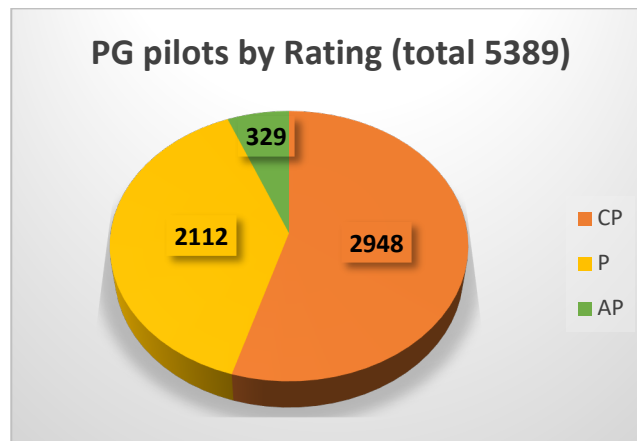
Ratings and incidents.

The following charts and tables are to enable a quick visualisation of membership breakdown per rating. The actual number of incidents can be seen in brackets in the ‘% incidents’ columns. A small change in the numbers can make a big difference in the percentages, especially for hang gliding due to the low numbers. Numbers of ‘serious’ incidents per rating are roughly in line with the number of pilots holding that rating.

HG	% HG members	% HG incidents
CP	47%	(4) 50%
P	34%	(2) 25%
AP	19%	(2) 25%



PG	% PG members	% PG incidents
CP	55%	(34) 50%
P	39%	(28) 41%
AP	6%	(6) 9%



The following table shows the relationship between Rating type, Glider class and the number of incidents for paragliders in 2018. This table includes both minor and serious incidents.

Glider Rating	No of Incidents	BHPA Rating		
		CP	P	AP
EN/LTF A	31	CP 10	P 1	AP 0
EN/LTF B	38	CP 13	P 12	AP 1
EN/LTF C	15	CP 2	P 11	AP 2
EN/LTF D	5	CP 0	P 2	AP 2

Clearly this table shows that being either AP rated and flying a class A glider, or being CP rated and flying a class D glider – are by far the safest options as there were no recorded incidents 😊.

Just my little joke! What the table actually indicates (hopefully) is that most people are flying a glider of the appropriate class and that's the glider they have the incident on. The vast majority of BHPA pilots are CP and P rated so common sense would dictate that most would be flying A and B class gliders. Therefore, it's hardly surprising that the EN A and B categories account for the majority of incidents.

The numbers in the table do not add up due to the inclusion of minor injury incidents. The numbers missing would be made up by school incidents (mostly A class gliders) and incidents involving non-rated or non-BHPA pilots.

Causal factors revisited.

I mentioned earlier that we'd take a closer look at "causal factors". The data is all very well but it involves the form filler ticking the appropriate boxes and this can be open to interpretation, omission (both deliberate and accidental) and mistakes. There were 200 reported "serious" incidents between 2016 and 2018. I decided to take a look at the written description for each report to see if there was something to read between the lines – and YES, it took ages!!

Approximately 10% of the incidents involved errors coming in to land with half of those being downwind landings. 15% involved errors attempting to take off. 30% involved glider handling errors. These usually involved the glider departing from normal flight or the pilot unintentionally causing the glider to depart from normal flight, and the pilot subsequently being unable to regain control. 10% involved strong winds and 10% involved strong, thermic conditions. The common theme among almost all the incidents was a misjudgement on behalf of the pilot. Misjudging the wind strength, misjudging the wind direction, misjudging thermal strength, misjudging gustiness, misjudging the shape and nature of the site/location concerned, misjudging the height and/or distance from a solid object (ground, slope, tree, building etc.). In other words, misjudging the prevailing conditions and the interaction of those conditions with the surrounding area/terrain. A typical example is the pilot who takes off and discovers the wind is a bit off the hill, it's a bit windier than expected, and the thermals are strong and punchy. Then you add in that it's a rough and rocky site, you've come off a night shift, or partied 'til the small hours the night before, or your partner is giving you grief, or you're feeling unwell etc. etc., and the whole thing is magnified. Any one thing in isolation is not a big deal for an experienced pilot. But the more things you add, the more serious the situation becomes. We can all manage the odd duck (e.g. wind a bit off) nibbling at our toes during a flight because a duck on its own is not threatening. We may even be comfortable with two ducks. But once you've got three or more, you're potentially in big trouble. The moral is do NOT allow an accumulation of adverse factors to influence your flight. Identify them, preferably before taking off, and deal with them, even if that means having to land, or not taking off in the first place.

And finally – a big thanks to all those who submitted reports. Without you we'd have no data to analyse. In an ideal world we'd have no incidents and no need for a database and periodic analysis. But incidents are part and parcel of the sport, and if they weren't, we'd probably go and do something else instead! If in any doubt about sending in a report – just send it anyway.



And I'll leave you with – Beware the Ducks!!