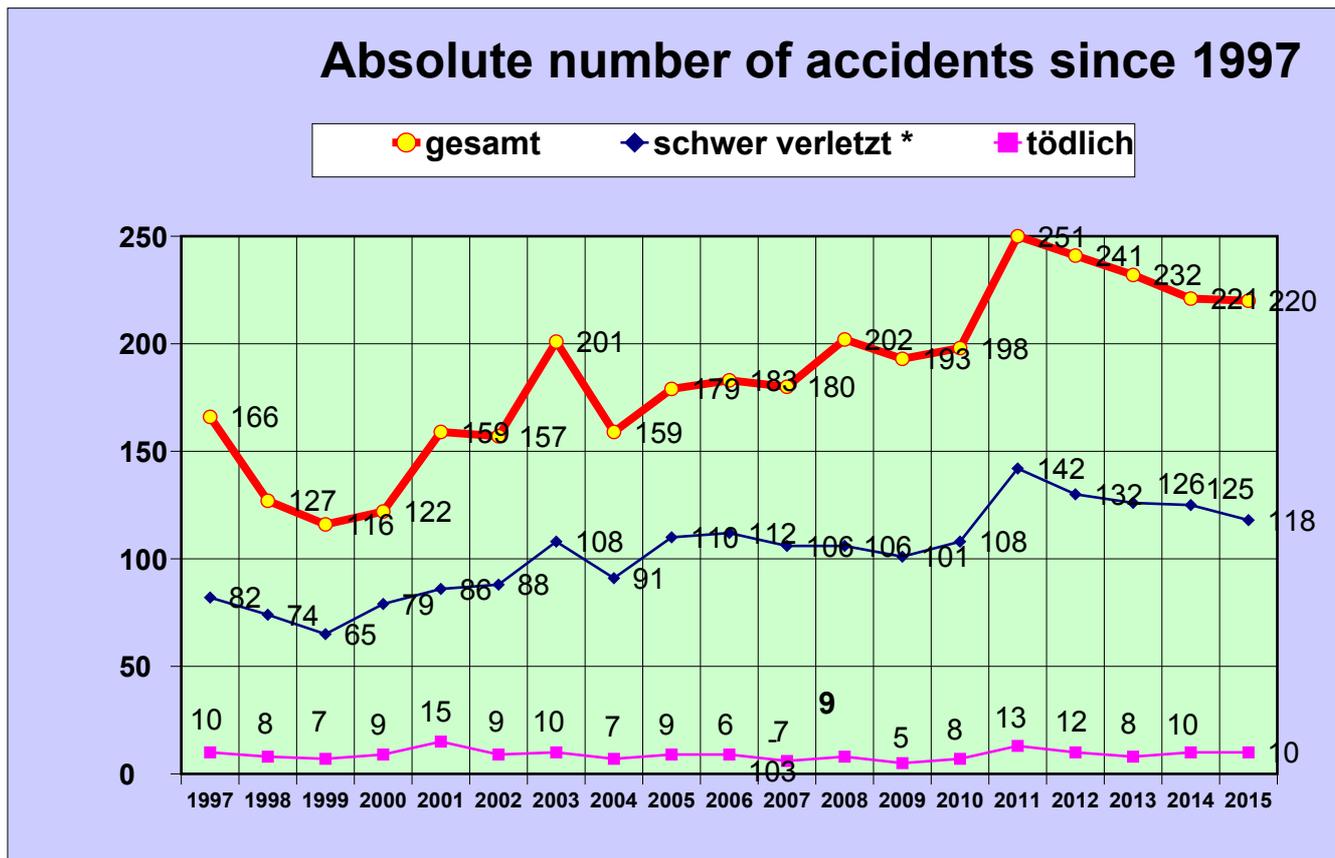


Paraglider Accident-Statistic 2015

Accident statistics (total / seriously injured / fatal)



In 2015, a total of 108 accidents and incidents with German pilots involved were reported in Germany, including 6 fatal accidents. Altogether with reports from foreign countries, the total number of reported accidents and incidents at home and abroad was 220, thereof 10 fatal accidents as well as 1 fatal accident of a foreign guest pilot.

The almost complete monitoring of accidents reported to the police, online accident reports, increasing use of the DHV rescue costs insurance and European wide entry of accidents in the EHPU database makes the number of unreported accidents and incidents shrink year over year. All fatal accidents have been registered completely for years. When looking at the numbers, you should keep in mind that since the beginning of the data recording in 1997, 20,000 DHV members were paragliding pilots, in 2015 that number had increased to 35,000.

Fatal accidents 2015

Out of 11 fatal accidents, two passengers were affected while flying tandem. These are the first fatal tandem accidents in Germany ever. The fatal accidents happened in Germany (6), Austria (3), Spain (1) and France (1).

January: Famara, Lanzarote. With steadily increasing (40-45km/h) wind, an experienced German paragliding pilot took off with his Triple Seven Rook (LTF B) at the so-called "Saubuckel", a hill upstream of the Famara ridge. It is likely that while he was groundhandling the wing up the hill, he was unintentionally levered. Probably because of the fact that his speed system was not working freely, the wing drifted to the edge of the slope by the strong

wind. There, with big ears, in the lee side of a gap in the terrain, the wing went into a severe front collapse and crashed about 40-50m to the ground. When hitting the ground, the pilot was fatally injured (detailed accident report at "Sicherheit und Technik" on www.dhv.de).

The malfunction of the speed system inevitably led to a drift to the lee side as the wind was significantly stronger than the trim speed of the wing. Flights with wind speeds that make a use of a speed system absolutely necessary, should be considered very carefully.

April: Kandel, Schwarzwald. Violent spring thermals and increasing south-westerly wind made paragliding very challenging at this day. Many pilots were at the Kandel take-off, but most decided not to start. A Polish guest pilot (license since 2014) had been in the air for several hours already when he flew into a section known to be very turbulent. There, due to eyewitness reports, the wing (Gradient Golden 4.28, LTF B) had a violent asymmetric collapse at a height of approximately 100m GND. The collapse did not fully recover and the wing went into a cravat-spiral. The pilot hit the ground at high speed. The reserve was not thrown. Four days later, the 55-year-old died in hospital due to his severe injuries.

Unfortunately, usually a lethal cocktail: Very demanding flight conditions, pilot with relatively low experience, little knowledge of the terrain and an aircraft whose reactions in extreme situations is too demanding for a beginner. And - no release of the reserve in an obvious crash situation.

April: Reden/Saarland. At this approx. 90m high spoil heap, a 53-year-old, not very experienced pilot flew with his LTF-A-Wing (U-Turn Emotion 2 M) into the lee-side of an upstream forest slope. The lee turbulences caused the wing to massively collapse asymmetrically. The wing immediately went into a quick rotation and pitched forward significantly. The pilot hit the ground with huge impact and suffered fatal injuries. The investigation through the DHV proved, that the brakes were significantly too short. This caused during test flights with the accident-related wing a class untypical, aggressive reaction to asymmetrical collapses (detailed accident report at "Sicherheit und Technik" on www.dhv.de).

This accident sheds light of a generally not very known problem. Brakes can shrink autonomously as the Dyneema-Material shrinks. Paragliding pilots should occasionally check while flying, if at fully released brakes a sufficient free travel is present.

April: Tegelberg, Bayern. Due to a pilot error of an inexperienced tandem pilot while s-turning to lose height during the landing approach the tandem-paraglider (Dudek Paragliders Orka 2/42, LTF B) went into a one-sided stall in about 100m GND. The wing spun about 270° and then pitched forward massively, collapsed and went into a cravat-spiral. The impact happened with an unrelenting spiral dive on a meadow. The pilot as well as the passenger suffered severe injuries. Three weeks after after the accident, the passenger died as a result of the injuries. The investigation through the DHV resulted in the assumption, that the pilot had possibly tried to pull the reserve but did not succeed due to a technical issue with the reserve handle (detailed accident report at "Sicherheit und Technik" on www.dhv.de).

June: Winch area Altes Lager, Brandenburg. An error when mounting the riser in the karabiner caused the fatal accident of a 39-year-old paragliding pilot. The pilot had connected the riser and the towing adapter with a cable tie. When mounting the riser, one one side, the towing adapter was connected to the karabiner, but not the riser, which did not attract anyone's attention due to the connection of the riser and the towing adapter. At about 300m GND, still connected to the winch, the cable tie broke and the riser parted from the harness. A rotating crash happened. The released reserve twisted in a way that made it impossible to open (detailed accident report at "Sicherheit und Technik" on www.dhv.de).

June: Schruns, Vorarlberg/Austria. During a thermal flight from Golms near Schruns in Vorarlberg, a 54-year-old German woman living in Austria was killed in an accident. According to the Austrian accident assessor her wing (Advance Sigma 8.23, LTF C) had an asymmetric collapse and went into a spiral dive due to a cravat that did not open. The reserve was not released.

June: St. Andre des Alpes, France. A 66-year-old German paragliding pilot crashed after a frontal collapse with a Skywalk Tequila M (LTF 1-2). In thermal conditions, the wing front collapsed, the pilot then over-braked the wing massively, forcing the wing into a full-stall. During the descent over 50-100m of altitude, the pilot kept both steering lines vigorously pulled which hindered the wing to recover. The impact happened in rocky terrain, the pilot was injured fatally.

During frontal collapses an incorrect use of brakes is dangerous and can cause the wing to stall. Do not hinder the wing from recovering by over-braking.

July: Hochries, Bayern. During a Walk&Fly competition, two experienced tandem pilots (both owner of a tandem pilot rating) took off from the Hochries. Eyewitnesses saw that the passenger was hanging in a peculiar low position in the harness immediately after the start. The pilot attempted an emergency landing on an alpine meadow and was almost successful. After touching ground, the wing got caught by a strong gust and was whirled up in a rotation. In the process, the passenger was ejected out of the harness. When impacting the ground, the passenger suffered fatal injuries. Cause of the accident was a not-locked leg belt. The assessor however did not want to rule out a technical defect that might have caused the leg belt to open during the take-off.

As in most cases with unlocked leg belts, again a front container resp. a front cockpit was involved. This front accessory makes an optical check of the leg belt locks very difficult.

August: Markbachjoch, Tirol. A 53-year-old German paragliding trainee fell out of her harness during one of her first altitude flights and was killed. The outdated, almost 20 years old harness had no falling out safety system. After an unsuccessful start attempt, the trainee had probably opened the leg belts and did not lock them before taking off again. The flight instructor assistant at the take-off did not notice this until the trainee had already taken off and began to slip out of the harness. Both flight instructors presumed that the harness had a safety system and planned to guide the trainee directly to the landing zone. After the first initial radio instructions, the trainee was not able to hold on and fell out of the harness more than 100m to the ground.

Old harness without a falling out safety system? →



August: Kössen, Tirol. A 27-year-old German A-License pilot with less than a year of flying experience caught the attention of other pilots while flying poor wingover attempts. One wingover got out of control and the wing (Skywalk Tequila 4, LTF B) collapsed massively. Thereupon, the pilot initiated a full-stall, that again got totally out of control, with strong oscillation, twisting of the pilot and finally massive forward-pitching and transition into a spiral dive. The reserve that was pulled by the pilot too late, got caught by the wing and did not open. When impacting the ground at full speed, the pilot suffered severe injuries and died on his way into the hospital.

Training of extreme flying maneuvers such as high wingovers, fullstall etc.: Only above water and during an accredited safety training.

September: Airfield Alsfeld, Hessen. Winch training. 8th flight of a 54-year-old flying trainee. After taking off, approx. 30-40m over ground, the wing drifted out of the towing direction due

to crosswinds. After, despite radio instructions through the flying instructor, the trainee did not change her direction, the cable pull was decreased. The flying instructor told the trainee to land in the towing direction with the cable still attached. Shortly after, approx. 10m above the ground, the trainee thoroughly pulled both brakes which caused the wing to go into a fullstall. The subsequent release of the brakes caused the wing to violently pitch forward and the trainee heavily impacted the ground when she oscillated under the wing, causing fatal injuries. The incident is still subject to legal proceedings. Possibly, the trainee misunderstood the instruction to land in towing direction as a call to land immediately.

Section Start and Take-off

Mistakes during pre-flight or start-check

10 (Previous year: 10, 2013: 11) accidents were caused in an inaccurate pre-flight or start-check.

"Tangling of lines, trailing edge right, strong drift to the right side. After weight shift to the healthy side and additional slight brake usage, the wing stalled". In 5 cases, undetected line tangles or blocked steering lines (once knotted in a glove-clip) caused crashes. 4 pilots suffered severe injuries. Twice, a line knot caused an immediate rotation back into the slope after take-off. In two other cases, an over-braking of the opposite side of the line knot caused stalls. Close to the slope one pilot impacted the ground and suffered severe injuries. In another case, the line knot was noticed by a flying instructor (during supervised flying). The instructor told the pilot how to stabilize the wing. This worked perfectly well until the pilot tried to perform a more significant change in direction. As a result, the wing stalled and spun. Thanks to the reserve that was pulled after a call through the instructor, this dangerous situation had no severe consequences.

Main area of errors at start preparation were open leg straps that caused two fatal injuries (see fatal accidents). Another pilot fell from his harness due to unlocked leg straps: But only after he quick-reacting flew his wing directly into a tree immediately after take-off. During the impact from 3-4m of height, he suffered severe bruises. In his accident report, he impressively describes how quickly he slipped out of the harness after taking off and how unbearable hanging from armpits is even for a few seconds. The three incidents happened with - concerning this matter - critical harnesses: One outdated harness without falling-out safety system, one harness with a front container and one harness without additional safety system that highlights unlocked leg belts.

The safety-conscious pilot makes a threefold check of strap-locks. When locking, he pays attention to an audible snap of the lock, visually, he checks if the lock keys are in the snapped position and through a tensile test with both hands he verifies that all other senses were correct and the lock is actually locked. In groups, a partner check is useful. Many flying schools practice this not only in training, but also in supervised flying.

„Immediately after take-off, the reserve released itself in about 4m of height and opened directly. As the wing did not fly anymore and the reserve did not yet fully carry the weight, the pilot landed from 4m of height rather roughly on his legs and suffered fractures".

Here a routine check of the splints on the outer container before the start (pre-flight check) would have helped the pilot prevent a severe leg injury.

With line knots or twisted steering lines: Always controlling the flight direction first (with line knots with a lot of weight shift and little brake usage on the opposite side, with entangled steering lines, steering with the rear riser or the steering line above the pulley) away from obstacles into the free airspace. Only thereafter approach the problem. If the line knot affects the behavior of the wing in a way that makes further flying unsafe, (braking the opposite side close to stall required to stabilize direction of flying) the pilot needs to decide if: Pulling the reserve or flying directly into a tree might not be much less risky than a stall during circling during a landing approach, suitable terrain provided. Plan the flight so that there is no need

to circle in the direction where steering in the opposite direction is required anyway. With line knots in the middle of the canopy, that leads the wing to fly dangerously slow, compensate through the use of your speed system.

Accidents during start

Out of 30 reported accidents during the start phase, 15 resulted in severe injuries. Main cause was a pull-up- or acceleration phase that had gotten out of control through cross winds, gusts, a premature slide into the harness or a failed aborted take-off, often when accelerating with already high speed. Forward pitch when pulling up the glider with subsequent collapse and crash of the pilot lateral or frontal into the slope is the second leading cause of accidents. As the unburdened wing does not brake anymore, the injuries caused by the following crash are often severe. Stumbling over bumps, steps, holes, etc. roughly brought the start to an end, mostly with torn ligaments or fractured ankles.

The start technique promoted through the DHV for the past years has a special focus on calm, overview and little dynamics during the entire start process. Extremely important: Be ready to abort your start. Many pilots "force" their take-off no-matter-what, not caring about their wing hanging to the side, pitching forward or going out of direction. The new training method promotes that the start should be aborted during the control phase if not all parameters are ok 100%. A big part of all take off accidents could be prevented if pilots started their take-offs with a canopy that was really ready to take-off. DHV video clips to current start- and flying techniques can be found at DHV-TV at www.dhv.de

Taking off with dangerous wind and weather conditions

It is interesting that there are a lot of self-critical accident reports, but also documents of naivety.

A beginner: "I made incorrect assumptions about the weather (light Föhn) and the wind, but it was mostly my handling mistake that was disastrous for my start. Immediately after pulling up my brand-new light wing, I was enormously pulled up after a couple of steps and subsequently hurled back into the slope. As a beginner, I took on much more difficult conditions and I may have been influenced by a group of pilots too, that put an end to my concerns I had in the beginning".

From a police report: *"The pilot known to be venturesome, took off despite of downwind, caused by the strong sink, he was not able to fly over the trees beneath the take-off area. The pilot circled in the take-off area and tried to land on the slope. The impact was so violent that the pilot lied on the ground unconscious"*.

Sit down, a little way away, observe carefully, the wind, the clouds, thermals, pilots that are already in the air. Ask yourself if under those conditions flying will be fun and with sufficient safety cushions. Only after that decide if you really want to fly. A sense for start conditions that become critical is not given to everyone. What is meant by frequency and severity of thermals or fluctuations in speed and direction of the wind. When does the murmur of the trees become threatening, what does the flight silhouette of other gliders in the air tell me about flying conditions etc.? Therefore, getting involved is permitted and even desired when other pilots prepare for take-off in questionable conditions.

Groundhandling

Taking into consideration how common groundhandling as a training method is nowadays, the number of (reported) accidents (5) are limited. Two severely injured, that were levered by gusts and smashed to the ground, two further pilots who were dragged over terrain and slightly injured. Crucial conditions should be avoided especially when groundhandling, a laminar wind at up to 20 km/h speed is ideal.

Section Flight

Collapses

In 2015, 61 accidents were reported after collapses, 34 asymmetric collapses, 18 frontal collapses, 9 collapses that were not further determined in the accident report (2014: 60,

2013: 49, 2012: 54, 2011: 57, 2010: 50, 2009: 43, 2008: 58, 2007: 60). In 11 incidents collapses led to cravats and subsequently a spiral dive. 27 pilots were severely injured, 5 died.

Collapse accidents, facts

Paragliders do not just collapse on their own just because they like to. Most of the time, not always, flying conditions are rough and turbulences accordingly strong. Reports like this one demonstrate that the high stability and resistance to collapses of modern XC wings does have a downside: *"At my second flight with this wing I came down on my reserve in a similar situation. The current situation again happened out of the blue - without any chance to prevent the incident while the collapse was evolving. This in fact is the shocking part of the situation."* Two other pilots used a quite similar wording: *"At strong XC flight conditions till then a trouble-free flight until - as though from nowhere - an extremely violent destroyer with a subsequent fall"*. Another pilot put it that way: *"In my view I did not have the required experience to notice first indicators of the steady increase in turbulences in the air and to acknowledge the degree of this change. The cascading collapses were so severe that my skills and my reactions did were insufficient to regain control of the wing"*.

The accident black spot is the collapse of wings close to the ground or the slope. Out of 57 accident reports that came with altitude indications after collapses, 40 exited with an altitude of less than 50m, 20 of those directly near ground-base of 20m or less.

Collapses during take-off have their causes especially in misjudgment of wind- and weather conditions, sometimes, as described in the following, combined with momentary inattention due to distraction: *"Wind turning North-West to South-West, safe take off as third pilot, asymmetric collapse while slipping into the harness, immediate change of direction with subsequent impact on meadow"*.

During landing approach, especially the impact of turbulence of upwind located obstacles as well as gusts through thermal lifts need to be mentioned as causes for accidents. Reports usually read like this: *"During final approach I got caught by a gust that caused a 50% collapse on my right side. The wing suddenly rotated to the right and I hit the road next to the landing zone with high sink speed"*.

Turbulent conditions require the pilot to fly extremely focused close to the ground in order to be able to react appropriately to possible incidents. It is usually much better to do an out landing in obstacle-free terrain rather than taking the risk to land behind obstacles with stronger winds at the landing zone.

Collapses at high altitude are usually only reported when as a consequence they lead to a cravat with a spiral dive. In 2015 11 such cases were reported. Initial incident for the cravat were in 6 cases an asymmetric collapse, in 3 cases a frontal and in 2 cases a no further determined collapse. They involved without exception only paragliders rated in the high LTF-B certification or higher. Except one, all pilots were using a pod harness. Most reported logically twists of lines and the impossibility of the pilot to intervene, just like this XC pilot: *"Likely pilot error causing the twist: Not straightening in the harness on time. Left brake blocked through the twist in braking position, on the right side also blocked. While twisted, two quick rotations then spiral dive, reserve deployment, self-packed reserve opens and the rotation stops until the ground, very soft landing"*.

10 Pilots released their reserve, one of them just in time for an opening after trying to recover the wing for several hundred meters of altitude.

The by far predominant part of the reported collapse accidents close to the ground is caused by an uncontrolled rotation in the direction of the collapse. Instead of controlling the dangerous rotation through weight shift and braking the opposite side, many pilots just focus

on the collapsed side. This hinders a timely perception of loss of height and ground proximity.

Current reports on how to prevent collapses and the correct reaction to asymmetric and frontal collapses can be found at Sicherheit und Technik at www.dhv.de.

Collisions

4 (Previous year: 8, 2013: 8) collisions (3 Paraglider/Paraglider, 1 Paraglider/Hanglider) were reported. 3 pilots were severely injured in those accidents. The collision between paraglider and hanglider happened in France while circling in thermals. The detailed circumstances are not clear. After the collision, both pilots deployed their reserves and were able to land uninjured. Out of the 3 collisions between paragliders, two happened during landing approach. From the accident description we know that in each case at least one of the pilots involved was extremely inattentive. An Italian flying trainee during his practical test flight, totally focused on his test landing and totally blind for anything that happened around him. And a pilot who flew in huge circles and without any recognizable landing approach right above the landing zone.

No matter if during landing approach or while soaring or XC flying. Haphazardly flying pilots should activate your own escape reflex. Get a safe distance and keep it, rather lose some height or even outland then taking a chance.

A pilot about to take off collided with another pilot approaching the take-off area at a Danish coastal site. She was severely injured in that accident.

Careful: Until 2015 the following rule applied in Germany (LuftVO): "A start may only take place if no danger of collision is apparent". Since the introduction of SERA this due diligence applies not only to the pilot taking off, but also for the pilot flying in the air.

A special problem is the joint flying of paragliders and hanggliders in a thermal. Hanggliders have a very limited field of vision upward and sideward, they are significantly faster than a paraglider and require a much longer reaction time for evasive maneuvers.

DHV-Videoclips on evasive maneuvers. Download at DHV-TV on www.dhv.de.

Stall

Stalls close to the ground often have severe consequences. Shocked, two flying instructors report how a flight trainee and a pilot with a brand-new license pulled their brakes up to the stop during final approach for no obvious reason.

„For no apparent reason, the pilot suddenly stalled the wing in 10m altitude and pulled the hands down. This resulted in a quick backward tilting of the wing followed by a sudden release of the brakes by the pilot. The resulting pitch forward and collapse of the leading edge of the wing caused a strong oscillation of the pilot which caused her to hit the ground frontally with high speed" (fatal injuries)"

What goes on inside pilots that make such serious mistakes?

Probably it is a mixture of optical misjudgment of height, lack of threat awareness and maybe a lack of information on dangers.

During flight trainer training we convey that during the final part of the final approach the perspective should change from the reference point to the horizon. Through this, the pilot is able to estimate ground approach in a much better way. Especially when the final approach is too high, holding on to looking at the reference point can be problematic. Poor height estimation and an intuitive tendency to brake harder in order not to gain too much distance to the reference point are possible causes.

Landing approach is the clear black spot of accidents with stalls. From one-sided stall of position circles (1 report with reserve deployment), impatient and with too much brake executed circles (3 reports), too strongly braked final approach (coming in too high) with one-sided stall through directional change (3 reports), up to the 2 reported one-sided stalls while toplanding. One pilot wrote: *"At short notice I decided to change my landing approach in order to land closer to the road. As with the remaining height I now needed to fly a 260° circle rather than a 90° circle, I increased brake pressure on the inner side in order to increase the speed of the circle. I assume that this caused the wing to stall on one side so that I uncontrollably hit the asphalt road"*.

5 pilots reported stalls while thermaling or soaring caused by over-braking on the inner side. Three reserve deployments, two tree landings. In two cases, pilots had overbraked and stalled their wings after they had pitched forward when exiting a thermal. One tandem pilot overbraked his steering line while s-circling in landing approach and crashed in a cascade (see fatal accidents).

Well documented through a video is a severe accident in strong and turbulent wind during final approach. Even though the pilot is not very heavy on the brakes, there is an abrupt fullstall close to the ground which results in a crash. Here again we see the phenomenon of the wind gradient. If the wind speed decreases significantly close to the ground, you need to be prepared for a sudden drop with a subsequent acceleration. When the pilot now prevents the wing to accelerate, it is possible to cause a stall even with very low brake pressure.

Three accidents were reported with deep stall. One pilot wrote: *"After an unproblematic start, the wing suddenly stopped in the air. A look at the canopy showed that it was open. There was no pressure on the brakes. When I looked down again, I already crashed to the ground"*. In this case a wing was involved - Team5 Blue - that already had a history of similar incidents (documented by a safety note). In two further cases the wings violently pitched forward after a deep stall similar situation. Both pilots threw their reserves. It is unclear if the deep stall was caused by the wings or through pilot errors.

At the article archive Sicherheit und Technik on www.dhv.de you can find a detailed report on the dangers of wind gradients and the correct pilot reaction as well as an analysis of stall accidents during landing approaches.

Spiral dive/Acro/Maneuver flights

No accident or incident was reported in connection with spiral dives in 2015. A controversy was an incident with a 777 Queen (LTF C). The pilot had been flying SATs when quite a few of the unsheathed lines ruptured. The pilot immediately threw his reserve and landed safely in an apple plantation. The DHV, 777 and the manufacturer of the lines Edelrid investigated the incident and came to the conclusion, that the lines met the requirements of LTF. Learn from this that with an XC wing that is optimized with lines that create as little air resistance as possible, you should rather not fly acro maneuvers.

In three cases wingovers went bad, three times the same process: Wingover to high with too little brake on the outer side, collapse of the high side with immediate cravat, spiral dive. One pilot died as his reserve got entangled with the wing. One pilot crashed in spiral dive on a car roof and suffered slight injuries. The third landed safely with his reserve.

During a safety training, a fresh A-license pilot fell into the canopy of his wing. While trying to approach the stall point of his wing, he stalled the wing that subsequently pitched forward under the pilot who then fell into the canopy. He fell several hundred meters of height into the lake but was extremely happy, due to an almost vertical posture during the crash, the impact was not fatal but only caused a few bruises and several rib fractures.

One B-Stall that had gotten out of control led to a cravat spiral dive with a reserve deployment. The pilot landed unharmed on a house roof.

While flying a test element (quick eight) a flight trainee stalled his wing and spun.

Tree landings/Tree contact

During the reporting period, 37 tree landings and tree contacts were reported. All (but 2) pilots who intentionally and purposefully landed in a tree, were at most slightly injured. That was different for one sided tree contact, unintentional tree landings (i.e. after a collapse close to the slope) and pilots that landed in trees after throwing their reserves: 14 pilots were severely injured as the wing did not get fully caught in the tree and the pilots crashed to the ground.

Tree contacts, especially when one-sided, are extremely dangerous. In case of doubt do not try to land on a clearing or a forest road or to maneuver through single trees. In an intentional tree landing, the tree should be approached frontally. Do not stall the wing before the tree landing but let it fly so that the wing can settle upon the branches. After the tree landing you should immediately try to get into a safe position and connect yourself to solid branches.

Other obstacles

One pilot got caught with his speed system on a flagpole during a deep overflight. He was able to hang on to the pole, but the pole broke off and the pilot crashed from 5m height to the ground where he suffered severe injuries. Another pilot misjudged his height when flying over power cables. The wing entangled itself, then came free again and the pilot crashed to the ground where again he suffered severe injuries. Thanks to the fact that car roofs have a relatively high elasticity, a pilot is still in good health who fell on one after a spiral dive. "*Pilot severely injured, cow unharmed*". A cow on the landing zone had been scared by preceding paraglider, the following pilot was not able to avoid the cow and crashed into it. In a lockout situation on a winch and without showing any reaction, a paragliding pilot crashed into the hall roof of the local aerial sport club.

Accidents during landing approach and landing

Next to stalls, collapses close to the ground and obstacle contacts, a sloppy landing approach is one of the major factors for accidents. Steep curves close to the ground and an instable final approach lead to a quick ground proximity and often to crashes. More than a dozen incidents with severe injuries could have been prevented if the pilots had observed the golden rules for a safe landing: a calm, stable and linear final approach.

Reserve deployments

28 (Previous year: 28, 2013: 22) reserve deployments were reported. Causes were: Collapse/cravat 15, collision 4, deep stall/spin/stall 4, loss of control while intentionally flying maneuvers 3, line knots 1, unintentional deployment 1.

6 pilots were severely injured as the reserve did not fully open (deployment in low altitude) or because of a rough landing (V-position, rock face, falling from tree). Two pilots broke their legs as they, according to eye witnesses, left their legs in a straight position while impacting rather than have them in a bent, ready to roll position.

In four cases the reserve did not open at all. In one case the reserve twisted due to the quick rotation of the glider during the fall (see fatal accidents). In another fatal accident, the deployed reserve entangled itself in the canopy and did not open. This dreaded entangling of the reserve with the canopy also happened during a performance training and it was only because of very lucky circumstances that the accident did not result in a fatality. A pilot had mistakenly interpreted radio instructions to pull big ears to be meant for herself and pulled - for not comprehensible reasons - both brakes. A cascading fall followed that finally went into a cravat deep spiral. Radio instructions to throw the reserve were only followed reluctantly, the inner container flew directly into the canopy. The pilot crashed into the ground and suffered severe, but not fatal injuries.

During a fully evolved spiral dive, the reserve entangling with the canopy is a huge danger. Therefore, it is very important to prevent this situation to happen. The reserve deployment, with as much energy as possible, should be thrown right at the beginning of the spiral dive. The rotation speed is still rather low in this phase which gives the reserve sufficient time to open. Quote from a 2015 accident report: *"I am positive that my previously completed safety training helped me throw my reserve courageously and quickly in a situation that was unsolvable for me"*.

Keep on reading in the online version at Sicherheit und Technik on www.dhv.de with further information on accidents when tandem flying, winch towing, more details on injuries and unusual accident reports.