

## DHV Accident Report 9.01.2011

Date	18.12.10	Time	15:15:00
Land	Germany	Site	Brauneck
Pilot	32 years old, DHV A-Licence since 2004	Experienced Acro-pilot	
Equipment: PG	U-Turn Thriller 20m <sup>2</sup> acro glider	Tested by	Not tested
Weight range	90-120kg	Pilot start weight	
Harness	Ava Sport Acro with foam protector and 2 underseat reserve containers	Reserve	1. Team 5 Orange ST steerable 2. Independence Seven Up L
Pilot Injuries	Fatal	Passenger Injuries	

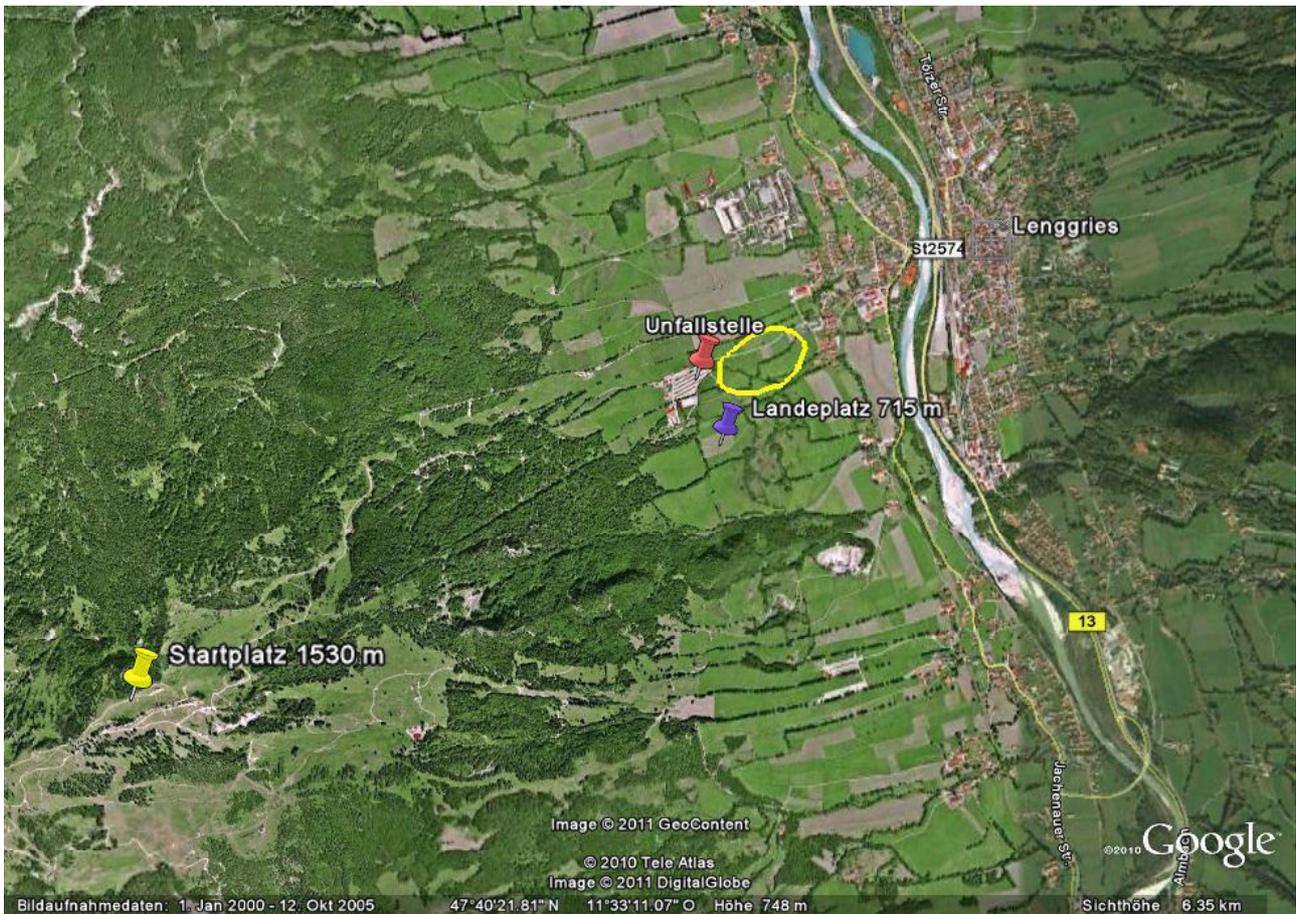
### Wind and weather

High pressure ridge, sunny, westerly winds, temperature <-5°C

### Accident

The Brauneck site has no starts suitable for westerly winds, consequently, there were only very few paraglider pilots in the air on the afternoon of the 18.12.2010. Due to this, the accident flight was observed by several competent witnesses on the ground.

The pilot flew out from the mountain at a relatively low altitude – probably due to increased sink rates from the large lee area created on the east face by the prevailing westerly winds. At approximately 250-300m over ground level, the pilot began to fly acro manoeuvres. Following an asymmetric SAT (different witness reports) the pilot entered an Infinity Tumbling manoeuvre. After several tumblings (2-5, differing witness reports), witnesses noted that the last tumbling looked asymmetric, the pilot was no longer over the middle of his glider, but offset to one side. Witnesses reported that this last tumbling looked very slow in comparison with the others. The glider collapsed in the middle, as the pilot was approximately vertically over- and offset to the left side of it. The pilot then fell backwards into the glider, which was at that moment beneath him. This occurred at about 150m over ground level. As the pilot fell into the glider he deployed his first reserve canopy (Team 5 Orange ST). Witnesses reported that the reserve successfully deployed from its inner container, but then became tangled in the lines of the glider rising to the right, and did not open. During the fall, the pilot slipped out of the main glider but remained suspended tangled in lines 1-2m below it. A successful deployment of the second reserve canopy was no longer possible. The pilot fell on to the east part of the Brauneck car park between the cars parked there. A mountain rescue team who were coincidentally present at the car park arrived at the scene of the accident within seconds and gave immediate first aid. Sadly, the force of impact had killed the pilot immediately.



*Picture 1: The Brauneck site with start “Startplatz”, landing “Landeplatz” and accident “Unfallstelle” indicated. The yellow circle indicates the area where acro flying is permitted. Acro flying is only permitted here, so as not to endanger other pilots preparing to land, or people on the ground.*

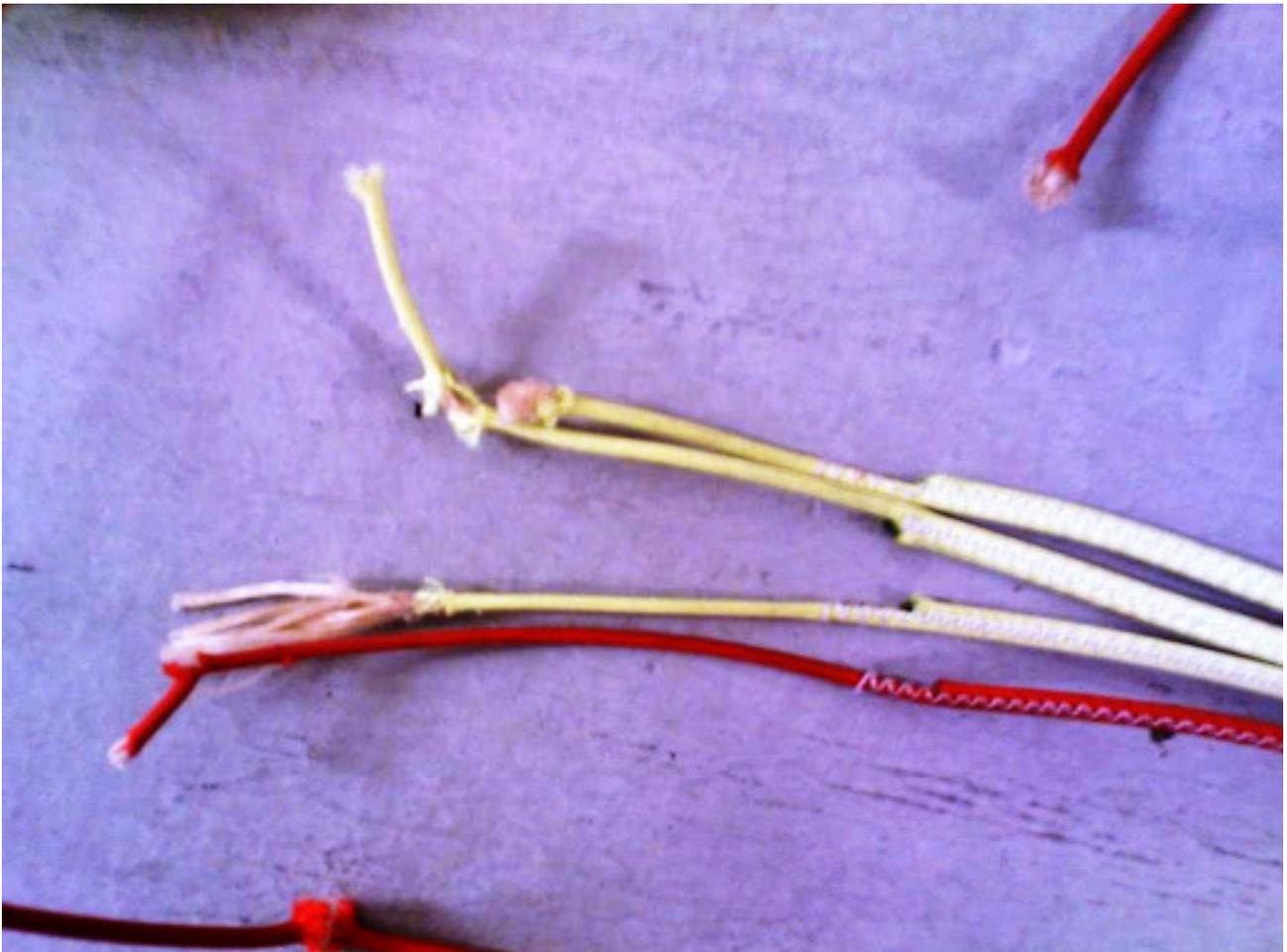
## **Accident investigation**

### **Equipment**

The pilot's entire flying equipment was inspected at the Police station, Bad Tölz on 20.12 and 21.12.2010.

### **Paraglider**

The glider was in good, nearly-new condition. There were no signs on the canopy which indicated a material failure which may have lead to the accident. Several lines had been cut to free the pilot at the site of the accident. The use of differing tools to cut the lines was evident on the investigation of the cut lines. Cleanly severed lines cut by a sharp knife contrasted with the ragged edges of those cut with a pair of blunt household scissors. Pictures of the differently cut lines were presented to competent examiners, who were all certain that this type of cut could not have resulted from overloading, but must have been made with a knife or other blunt tool.



*Picture 2. Ragged edged cut lines from part of the canopy line set. On one part of the line set, lines had severed directly above the sewn part of the lines.*

The line set on the right hand side of the glider was completely intact. It is most probable that no lines broke here due to overloading. Part of the line set from the left hand side of the glider was no longer present. The missing lines and part of the left hand riser were cut away at the site of the accident. It could not be determined with 100% certainty that no line breaks due to overloading occurred on the left hand side of the glider. The remaining lines still present on the glider did not indicate that overloading had taken place. At request from the DHV, the mountain rescue team leader asked all members of the team if they could remember seeing broken lines due to overloading at the site of the accident. None of the team members could remember seeing broken lines. No other accident witnesses could remember seeing broken lines at the accident site.



## Harness

The harness investigation produced no abnormalities. Both Finsterwalder Quick-out carabiners were closed and had the remains of the risers in them. Both reserve outer containers were opened and empty. Connecting lines to the reserve canopies were correctly installed, and attached at the shoulder points on the harness. A rescue knife was secured in its sheath on one shoulder strap.

## Reserve Canopies

### 1. Team 5 Orange ST, steerable

The reserve had deployed completely but was completely tangled in the lines of the main glider. This had been noted by mountain rescue team members at the accident site. Both attachment lines to the harness (the steerable Orange ST has two attachment lines) had been cleanly cut at the accident site. There was nothing to indicate that the reserve had suffered a failure during deployment (e.g. brakes on lines, canopy or attachment lines).

Investigation of the reserve canopy indicated it had completely deployed from the inner container, all packing rubber bands were released. The inner container was retrieved approx. 15m from the site of the accident. Witnesses reported seeing “something white” descend near the pilot. Investigations of the equipment back up the witness reports, the reserve had deployed, the inner container separated and the lines of the reserve were extended. The reserve had begun to inflate. One indication that the inflation process had not continued was however found. The pilot had successfully deployed his reserve a few weeks prior to the accident after an acro manoeuvre went wrong. After this, he had packed the reserve himself and re-installed it in his harness. The pilot had used knotted household rubber bands to secure the reserve lines above the reserve risers, probably because the velcro closure on the harness was too small to cover the connecting line correctly. These rubber bands were still intact, and would have released had

minimum force been applied. This was not the case.



*Picture 4. Unreleased rubber bands above riser attachment point on Orange ST reserve.*

## 2. Reserve (Independence Seven Up L)

This reserve was found at the accident site as follows: deployed from the outer container, inner container opened, most of the reserve still in the inner container, folded in S-bends. The lines of the reserve were mostly still bundled and the retaining rubber bands were still present. This reserve was clear of the main glider and not tangled in it.

The pilot had managed to deploy the reserve from its outer container, but the reserve had not completely deployed from its inner container and inflated.

### **Accident sequence, pilot and equipment**

The pilot was an experienced acro pilot who had already participated in an FAI acro competition. Future competition participation was planned. The pilot had learnt the high risk manoeuvre “Infinity tumbling” in Austria over water, and had practiced this manoeuvre several times at the Brauneck site during the last month. The pilot wanted to perform an acro show for the Brauneck ski season opening, scheduled for the day after the accident.

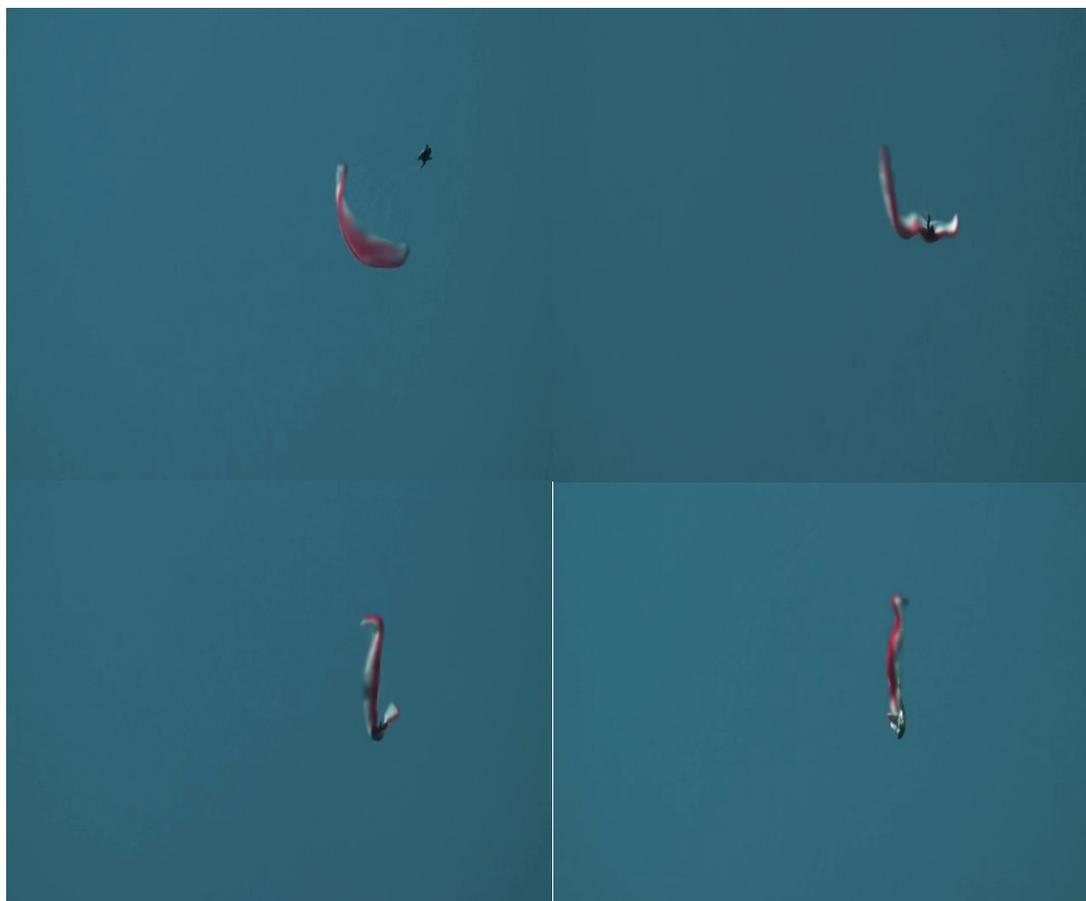
Two world wide recognised acro pilots were asked to comment on the accident. Both were of the opinion that a mistake in exiting the manoeuvre was probably the reason for the accident. Witnesses reported observing how the glider entered the last tumbling very slowly and then collapsed similar to a full stall, while the pilot was vertically above and offset to the side of it. The acro specialists commented that the pilot had probably applied break too early during the exit phase of the manoeuvre, causing the glider to stop rotating while it was at its lowest position.

The faultless condition of the pilot's equipment, and the type of safety equipment present (two high-quality reserve canopies and a rescue knife) indicate that the pilot appreciated the risks he was taking, and wanted to minimise them through his choice of equipment. The pilot's reactions as he fell into the glider indicate he was conscious of the danger he was in, and trying to resolve the situation: the pilot had deployed the first reserve before he was fully wrapped in the collapsed

glider, knowing that a successful reserve deployment when wrapped in a canopy would be very difficult.

The pilot has been described by fellow acro pilots as having a somewhat casual attitude towards risk taking. At other times he had practised acro manoeuvres with a much greater height reserve.

With regard to the flying equipment used – nothing indicated that the accident was caused by an equipment failure.



*Pictures 5-8: these pictures (of a different accident) indicate the sequence of events. Top left: the pilot begins to fall towards the glider, contact with the canopy after 0.7 seconds (top right). At this moment the reserve deployment was witnessed. The reserve became tangled in the main canopy as it rose up asymmetrically within a further 0.3 seconds (lower left) and did not open correctly due to this. Lower right: the pilot is completely wrapped in the glider and falling at high velocity to the ground.*

### **Accident sequence, wind and weather**

The weather played a role in the accident sequence in that the lee situation created by westerly winds over the Brauneck resulted in the low height over ground level once the pilot had decided to perform the acro manoeuvres. The flight distance was approximately 3km, with a height loss of 500-550m. This indicates a sink rate of 1.8-2 m/s.

### **Conclusions**

The accident occurred:

- because the pilot probably made a mistake while performing the high risk acro manoeuvre “Infinity tumbling”, fell into the glider and could not successfully deploy his reserve canopy.

Additional factors that played a role in the accident sequence:

- the low height over ground at the point where the pilot decided to perform the acro manoeuvres. After falling into the canopy the remaining 150m over ground was not sufficient for the deployment of one of the two reserve canopies carried by the pilot. After the pilot had realised that the first reserve had not deployed correctly, he then deployed the second reserve. At this time the pilot was suspended approximately 1-2m below the main glider and no longer fully wrapped in it. The chances of a successful reserve deployment in this situation would have been much higher than before when wrapped in the main canopy. The remaining height was not sufficient for the successful deployment of the second reserve.
- Possible training pressure for the upcoming acro presentation planned for the next day at the ski season opening.
- Crashing on to the hard frozen car park at the Brauneck.

### **Miscellaneous**

The acro Manoeuvre “Infinity tumbling” is prohibited in Germany in accordance with §8 if the German Air regulations (FBO) as it requires a pitch angle of  $>135^\circ$

The site owner at the Brauneck has defined an area where acro manoeuvres may be flown. This is over free grassy fields between the car park and the old cable car station. This area was defined to prevent pilots performing acro manoeuvres from interfering with other pilots preparing for landing, or endangering persons on the ground. The accident pilot performed acro manoeuvres further to the west directly over the car park, not in the designated area, and therefore put third parties at considerable risk. At the time of the accident, several people were returning to their cars after skiing and were in the immediate vicinity of the accident site.

The pilot's GPS was investigated, but it contained no recordings of the accident flight. The pilot's helmet had an attachment point for a GoPro video camera – this was not present during the accident flight.

### **Safety advisories**

None.

Gmund 9.01.2011

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DHV Safety department