

ACCIDENT

Aircraft Type and Registration:	Cameron N-90 Balloon, G-INSR	
No & Type of Engines:	Cameron Super Mark 4 twin burners	
Year of Manufacture:	1998	
Date & Time (UTC):	8 September 2006 at 1745 hrs	
Location:	Wood Dalling, Norfolk	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 2
Injuries:	Crew - 1 (Serious)	Passengers - 1 (Minor)
Nature of Damage:	No damage to balloon	
Commander's Licence:	Private Pilot's Licence (Balloon)	
Commander's Age:	43 years	
Commander's Flying Experience:	54 hours (of which 46 were on type) Last 90 days - 9 hours Last 28 days - 4 hours	
Information Source:	AAIB Field Investigation	

Synopsis

While landing the balloon in a relatively strong wind, the pilot was thrown from the basket. His leg became entangled in the balloon parachute ripline and as the balloon became airborne again, he was carried into the air, hanging below the basket. At approximately 30 feet agl, the line unravelled itself and the pilot fell to the ground. The balloon descended with the two passengers on board pulling on the ripline, and landed without further incident. One safety recommendation has been made.

History of the flight

The decision to fly this early evening flight was taken earlier that afternoon after the pilot had checked the relevant meteorological forecasts. He then telephoned

his balloon club's co-ordinator who arranged for the balloon and several of the club's members to meet the pilot at a public house car park. This is one of the club's regular launch sites and the pilot was familiar with operating from this location. After the pilot had completed his initial safety checks, the two passengers climbed into the basket and the pilot briefed them on safety procedures. One of the passengers had flown several times before with him but the other was introduced as a new club member and it was to be his first flight. The safety briefing included where the passengers should position themselves, what they could and could not touch and how they should prepare for the landing. On conclusion of the brief, the passengers vacated the basket whilst the balloon envelope was

attached and inflated. The pilot and passengers then reboarded and the balloon took off at 1653 hrs. The passenger on his first balloon flight recalled that “it was still windy as the balloon and basket were blowing about and the [ground] crew were endeavouring to keep it steady for departure”. The pilot reported that it “is usual on inflation for the balloon to move around until it is fully pressurised”.

After takeoff the balloon climbed to approximately 2,000 feet agl and followed a mean track of 290° at 11 kt. The flight continued uneventfully for an hour and the pilot then made preparations for landing. A landing field was selected and the passengers adopted their briefed landing positions when the balloon was approximately 50 feet agl. At this point the pilot had to arrest the balloon’s descent briefly as they were heading for a small copse of trees in the middle of the landing field, the rest of which was covered in short stubble. On passing over the trees, he pulled on the red rope (ripline) that opens the ‘parachute’ valve in the top of the envelope to allow air to escape and the descent to continue. The basket touched down on its front corner which had the effect of pitching the basket rapidly forward and the pilot, who was in the usual position of holding onto the red rope with both hands, was ejected out of the basket. He landed on the ground ahead of the basket and was then run over by it as it continued to drag across the field. As it did so, the ripline wrapped itself around his right foot and he was briefly dragged along the field before the basket became airborne again with the pilot hanging beneath it. At a height of between 20 and 40 feet the line unravelled itself from the pilot’s foot and he dropped to the ground, landing on his back. He remained conscious and shouted to the passengers “pull on the red rope”. The passengers heard this, pulled the ripline and the basket descended and struck the ground. It was pulled onto its side by the

envelope before coming to rest. The passengers were able to vacate the basket and turn the gas burners off before checking on the condition of the pilot who was lying approximately 100 metres away.

Using mobile telephones, the retrieval crew and emergency services were directed to the field and the pilot was taken to hospital where he remained for six weeks. One of the passengers also required treatment for a cut sustained during the second landing.

Meteorology

Prior to the flight, the pilot contacted the Met Office and obtained the ‘UK Low-Level Spot Wind Chart’ (Form 214), the ‘Forecast Weather Below 10,000 feet’ (Form 215) and the ‘Airmet Balloon Forecast’ for the relevant area. These forecasts stated that a moderate and stable south-easterly flow would affect the area with isolated cloud at 2,000 feet amsl and excellent visibility. The surface wind was forecast to be 080°/5 to 8 kt.

The pilot carried GPS equipment on board the balloon which displayed and recorded the groundspeed of the balloon. This recorded groundspeeds (which can be considered windspeeds) during the initial part of the takeoff of less than 5 kt. The data does not precisely depict the time of the first touchdown, but during the last three minutes of the flight, the maximum recorded groundspeed is 11.7 kt with an average over the same period of 8 kt.

Flight status

The passenger taking his first balloon flight had joined the balloon club as a result of responding to a radio charity auction. In November 2005 a local radio station invited listeners to bid for a donated event using the phrase:

'Take to the skies in the (company) hot air balloon. If it is your first flight you will receive a champagne reception on landing and you will be presented with a First flight certificate.'

The passenger was told that his bid had been successful and sent a letter explaining that the balloon sponsor was:

'pleased to donate membership of the Balloon Club from 1 November 2005 which will include a flight for one person in our sponsored hot air balloon, to be taken during the membership.'

Although the passenger originally believed he had bid for a commercial balloon flight, he accepted that what he had actually purchased was membership of a private balloon club which included one flight.

Any flights taken by club members are technically private flights and as such do not require the balloon operator to hold or comply with an Air Operators' Certificate (Balloons). Pertinent differences between private and commercial flights are that pilots flying privately are not required to hold a commercial pilot's licence and they are also not required to use a pilot restraint harness.

The CAA publication CAP 611 'Air Operators' Certificate: Operation of Balloons' states that in order to operate public transport balloons, an operator must include instruction on:

'The use of pilot restraint harnesses that are fitted to all company balloons. Instructions must state that such harnesses must be worn and attached before the balloon quick release restraint is released, worn throughout the flight, and not released until the end of the flight when the balloon has come to a complete and final standstill.'

The British Balloon and Airship Club (BBAC) training manual section 15.3 states that:

'A pilot restraint, as used in public transport balloons, could be very useful.'

Balloon details

Issue 10 of the Cameron Hot Air Balloon Manual Section 2.2 states:

- '1. Balloons must not be flown free in surface winds greater than 15 kt.*
- '2. The balloon must not be flown in meteorological conditions which could give rise to erratic winds and gusts of 10 kt above the mean wind speed.'*

This balloon was not fitted with turning vents which are side vents that allow the balloon to rotate. Turning vents are particularly useful for balloons with rectangular baskets (as in this case) to allow the longer side of the basket to be aligned perpendicular to the landing direction.

Analysis

This flight was conducted within the balloon's weather limitations and the pilot held the required qualifications to fly with the balloon club members. Despite this, a situation developed where the balloon became airborne without a qualified pilot on board, hazarding the passengers and seriously injuring the pilot.

Although the landing wind was close to the operating limits, there was no reason why the pilot would not have been able to control a landing under these circumstances and if he had remained in the basket, it is likely that there would have been no injuries. Without turning vents, landing on the forward edge

of the basket is always a possibility and therefore consideration needs to be given towards keeping the occupants in the basket. The passengers have their hands free to hold the grab handles inside the basket but the pilot is likely to be holding onto the parachute ripline with both hands and is consequently more vulnerable to being thrown out. As previously stated, commercial balloon operations require the pilot to wear a restraint harness and this would have prevented the pilot's ejection in this accident. After this accident, the BBAC issued a safety newsflash recommending that on all flights the pilot should wear a suitable harness with the means to fasten himself securely into the basket. The newsflash emphasised that the harness does not have to be attached for the duration of the flight but recommends attaching it to the basket, if required, as part of the pre-landing checks.

Follow-up action

This incident was discussed at a meeting of the private balloon club committee on 8 October 2006. The minutes of the meeting recorded the following;

'We have learned a lot from the recent accident and the following procedure will be put into place. A harness will be bought for the pilot to be worn by him on all flights and clipped onto a secure

fastening on the basket when coming into land. All crew will have special emergency training to include: pulling the parachute out, making sure the gas is off and safe, emergency radio procedures. We will have practical sessions ... and draw up some written reminders.

It was also discussed that there should always be a trained crew member in the basket with a new passenger to help the pilot and take charge in an emergency. Crew briefing from now on will always include reminders of the emergency procedures.'

Safety Recommendation

As a result of this accident, the following Safety Recommendation is made:

Safety Recommendation 2007-47

It is recommended that the CAA, in conjunction with the BBAC, encourages pilots on all private balloon flights to wear suitable harnesses with the means to fasten themselves securely into the basket when required.