AAIB Bulletin No: 4/2005 **Ref: EW/G2004/09/16** **Category: 3**

Aircraft Type and Registration:	Cameron A-250, G-BWKX	
No & Type of Engines:	None	
Year of Manufacture:	1996	
Date & Time (UTC):	5 September 2004 at 1815 hrs	
Location:	Near South Stoke, Arundel, West Sussex	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 1	Passengers - 9
Injuries:	Crew - None	Passengers - 1 (Serious)
Nature of Damage:	None	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	55 years	
Commander's Flying Experience:	981 hours (of which 594 were on type) Last 90 days - 44 hours Last 28 days - 21 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

At the conclusion of a commercial pleasure flight the balloon landed at unexpectedly high ground speed, due probably to local wind effects. Despite being correctly positioned for the firm landing, one passenger sustained fractures in both legs.

Background information

The pilot had planned to take nine passengers on a one hour pleasure flight from Hickstead showground travelling to the southwest. He had obtained a weather forecast from the Met Office Internet web site which indicated good weather for the intended flight. The surface wind was forecast as varying between 050º and 100º at 6 to 9 kt, with the wind at 1,000 feet from 070º at 15 kt. Visibility was 8,000 metres with no significant weather, scattered cloud at 6,500 feet and surface temperature 18ºC.

The balloon operator's instruction to its experienced pilots regarding wind speeds were that they were not to fly if the surface wind speed was expected to exceed 15 kt.

Balloon description

The Cameron A250 balloon envelope has a cubic capacity of some 250,000 cubic feet and can lift a basket holding up to 15 persons. The balloon's basket is of wicker construction measuring 1.6 metres wide by 3.0 metres long and 1.2 metres deep; it is divided into five compartments. A central compartment runs the full width of the basket in which the pilot and gas cylinders are located. The two compartments either side of the pilot's compartment are each sub-divided into two which provides a compartment at each corner in which three passengers can stand. The centre compartment provides the pilot with full-length movement across the basket with control of the gas cylinders and central burner. Passenger protection is provided by a suede-covered cushion along the tops of the wicker surfaces and shock absorbent pads on the floor and walls of each compartment.

Two rotation vents on the balloon envelope allow the basket to be turned but do not control the direction in which the balloon travels. The top of the balloon envelope has a large hole into which a parachute-shaped inner envelope sits forming an air tight seal. On this balloon a 'Smart Vent' is fitted where the parachute has ropes attached to it at multiple points. When the control rope is operated, the parachute vent collapses and the hot air in the balloon envelope is released causing swift collapse of the main balloon envelope.

History of the flight

The passengers gathered at the showground and received a briefing on the balloon assembly and inflation procedures, followed by the anticipated sequence of events. A safety briefing on the position to be adopted for landing was given. This required each passenger to place their back against the wicker basket ensuring that they had their back towards the direction of landing with their knees bent. The procedure was briefed again and rehearsed when the passengers had boarded.

Ground crew and passengers assisted with the assembly and inflation of the balloon. During the early part of the inflation, a Chad balloon was seen launching from a site approximately 1 km to the north-east of the showground. The pilot noted its speed and direction which appeared consistent with the forecast wind.

Having completed the inflation of the balloon, the pilot and passengers boarded the basket and received a further briefing including the passenger landing position and stowage of personal items such as cameras. The balloon envelope was vertical with only the light wind forecast and an uneventful departure was made climbing to 1,300 feet agl. The wind direction and speed were

derived from a GPS receiver and indicated 050º to 060º at 12 kt. The wind speed increased during the flight to between 17 kt and 19 kt at 1,000 feet with little decrease below that level.

The pilot of the Chad balloon, which was observed departing earlier, was on a similar flight approximately 15 minutes ahead and, following some discussion between them, he relayed to the Cameron pilot that the surface wind at Goodwood was calm. Colleagues of the Cameron balloon pilot flying in the Petworth area some 15 nm west of his position were reporting winds of 6 to 7 kt.

As normal, after approximately 45 minutes, the pilot began to look for a suitable landing site. At about that time the Chad balloon pilot landed and reported that the wind speed during his landing had decreased to 9 kt. Having identified a landing field, the Cameron balloon pilot commenced his approach to land but the wind speed was indicating 14 to 16 kt. The selected field had obstacles of trees and hedges on the far side and so, in view of the likely landing speed, the pilot abandoned that approach and continued the flight at low height, crossing the River Arun at South Stoke. The pilot could see an area of open fields on the downwind side of a farm and, having ensured that the passengers were in the correct landing position, he made an approach to a suitable field with the wind speed still at about 12 to 14 kt.

The landing technique adopted when groundspeed is high is to make a shallow approach and when positively on the ground, operate the 'Smart Vent' to collapse the envelope and prevent the basket being dragged along the ground. The balloon touched down positively and rose back into the air, clearing a boundary fence before touching down again and coming to a stop in the adjoining field, with the basket tipped on its side due to the touch down speed. All the passengers remained in their landing positions in the basket whilst the pilot made safe the balloon. One passenger in the top right compartment (when viewed from above the basket) had sustained leg injuries on the first touch down, despite appearing to be in the correct landing position. She was made comfortable in the basket and an ambulance was called. It arrived within five to ten minutes and conveyed the injured passenger to hospital where fractures in both legs were diagnosed.

Conclusion

The pilot concluded that whilst the landing was firm and the surface wind had increased above that forecast, he was surprised that the passenger had injured her legs because, as far as he could see, she had been correctly positioned. The wind was much as forecast with some local gusting which was also experienced by some of the other balloons.

A video recording provided by the injured passenger covered the early part of the balloon assembly, the briefing and some of the flight. The recording confirmed the report submitted by the pilot.