Aviation Safety Investigation Report 199402878

Kavanagh Balloons Pty Ltd E-120

09 October 1994

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Occurrence Number:	199402878		Occurrence	e Type:	Accident	
Location:	Boondall					
State:	QLD		Inv Catego	ry:	3	
Date:	Sunday 09 Octo	ober 1994				
Time:	0714 hours		Time Zone		EST	
Highest Injury Level:	Minor					
Injuries:						
		Fatal	Serious	Minor	None	e Total
	Crew	0	0	0	1	1
	Ground	0	0	0	C) 0
	Passenger	0	0	2	4	6
	Total	0	0	2	5	; 7
Aircraft Manufacture	er: Kavanagh Ba	alloons Pt	y Ltd			
Aircraft Model:	E-120					
Aircraft Registration:	VH-AQF		Seri	ial Num	iber: KB 🛛	134
Type of Operation:	Charter	Passenger	r			
Damage to Aircraft:	Substantial					
Departure Point:	Gregory Park, Brisbane QLD					
Departure Time:	0630 EST					
Destination:	Marchant Park, Brisbane QLD					

Crew Details:

	Hours on				
Role	Class of Licence	Type Hours	s Total		
Pilot-In-Command	Commercial	242.0	242		

Approved for Release: Friday, September 6, 1996

FACTUAL INFORMATION

Sequence of events

The balloon, with the pilot and six passengers on board, was launched following a delay of about 30 minutes due to the late arrival of a passenger, and the need to change to an alternative launch site. It was the last of three balloons in a loose formation travelling to the north-east under the influence of a weak south-westerly breeze. The initial cruising height was about 1,000 ft above ground level (AGL). Soon after passing to the west of the central business district, the balloon descended to a height estimated by witnesses to have been between 100 and 200 ft. During this phase of the flight the passengers, by raising their voices, were able to talk with people on the ground.

The pilot then climbed the balloon to about 500 ft before descending to an estimated 50 to 100 ft AGL. The flight continued at low level for approximately 3 km before it became apparent that the balloon was on a collision course with a house. The pilot and passengers reported that the balloon would not rise despite extensive use of the burners. The balloon basket struck the wall of the house and was dragged over the roof.

Two people who observed the balloon, one before impact and the other after impact, reported that they had seen an open panel on the side of the balloon.

The balloon continued and collided with the roof of a second house one street to the north-east, approximately 150 m from the first collision. This impact penetrated the roof structure of the house. The basket remained on the roof for about a minute, during which the pilot continued to use the burners in an attempt to obtain lift. However, the skirt of the balloon caught fire. The basket then broke free from the roof, demolished a section of brick fence, and the balloon envelope became entangled in a roadside powerline.

Having used the burners for several minutes, the pilot freed the balloon from the powerline and climbed to about 500 ft. The skirt fire self-extinguished. About 5-10 minutes later, the pilot selected a small park as a landing area. She had not changed fuel tanks, consequently, only one burner was available for the final approach to land. The balloon landed short, striking the bank of a small creek. The basket was dragged on its side until the envelope draped over a set of powerlines. All occupants climbed from the basket when advised by the pilot and ground crew that it was safe to do so.

Balloon examination

No pre-existing fault was found with the balloon envelope or the burner and fuel system. However, fire damage to the balloon skirt and to the lower envelope was evident. The basket was abraded and some of the cane structure had fractured.

Pilot experience and currency

During the previous 90 days, the pilot had flown 2.5 hours in command on the balloon type, and had completed a currency check on 18 September 1994. However, she was not familiar with the area over which the accident flight was conducted.

Wind Effect

The Bureau of Meteorology analysed the meteorological conditions spanning the flight time of the balloon. The analysis indicated a 5 to 10 kt wind to 500 ft from a south-south-westerly direction, with a more westerly component at the lower levels. The air in the lowest layers was stable and the wind strength was too weak to cause mechanical turbulence. It was possible that uniform descending air was present in the lee of hills around the Wavell Heights area, but the effect would have been light. This analysis was based on an open terrain assessment, consequently the conditions may have been enhanced by local funnelling between buildings.

The houses which were struck by the balloon were some 500 m downwind of a low ridgeline. The pilot of another balloon operating in the area at a greater height said that he had noticed a flattening of the balloon envelope, indicating an increase in wind velocity or possibly a down draft. Flattening of the envelope would have the effect of expelling hot air, resulting in a loss of lift. The pilot of the accident balloon reported that the balloon had been pushed into the side of the house by a very severe downdraft. Continuous power from both burners had been used by the pilot in an attempt to regain control, but sufficient lift was not achieved.

ANALYSIS

The weather conditions as assessed by the Bureau of Meteorology and those reported by the pilot of another balloon, suggest that the pilot of VH-AQF should not have experienced difficulty due to wind effect alone. However, the operation of a balloon at a very low height requires that the pilot must be extremely aware, particularly of the topography and the local conditions. The pilot's ability to constantly anticipate the influence of these factors on the performance of the balloon is critical to its safe operation.

The pilot reported that a severe downdraft had affected the balloon. However, it is likely that the balloon had been in a subtle descent for some time before the pilot realised. Consequently, power was applied too late to avoid collision with the house. The pilot did not then consider the option of deflating the balloon and terminating the flight, but applied continuous power from both burners. The dragging basket and surface wind partially flattened the envelope. However, the pilot persisted, despite further collisions, until the balloon lifted clear. The pilot subsequently landed the balloon heavily when only one burner was available to control the descent.

The reported open balloon panel was most likely a rotational vent. The open vent should not have significantly affected the performance of the balloon.

CONCLUSIONS

Findings

- 1. The pilot was qualified to conduct the flight.
- 2. The balloon launch was delayed, resulting in exposure of the flight to winds which were stronger than anticipated.
- 3. The pilot was not familiar with the area over which the flight was conducted.
- 4. The balloon entered a descent, probably caused by a weak downdraft or windshear.

Significant Factors

1. While being operated at a very low height the balloon entered a descent.

2. The pilot applied power too late to prevent collision with a house.

SAFETY ACTION

Action by the CAA

On 19th October 1994, the District Flight Operations Manager of the Archerfield District Office of the Civil Aviation Authority issued a variation to the operator's permit to operate hot-air balloons. Paragraph 5 (g) (iii) of the operator's permit was amended to read:

(5) The pilot in command of the balloon shall conduct the flight(s) in accordance with the following procedures:

(g) not fly a balloon in free flight;

(iii) within a radius of 300 metres of any city, town or populous area below 1000 feet a.g.l.;

Prior to the variation, sub-paragraph (iii) began with the words 'except during launch and landing'.

With effect from 31 October 1994, the above Variation to Permit was rescinded and replaced with an Operations Manual Directive which was issued to all Commercial Balloon Operators in the Archerfield District Office's area of responsibility. The directive was issued to assist in ensuring safety by improving the reliability of commercial balloon operations in the vicinity of builtup and populous areas. Other requirements were also imposed which are designed to assist in the safe conduct of these flights by limiting operations in areas which are likely to cause an increase in risk. The directive specifically mentioned that Operations Manuals were to be amended to address conditions for flight below 1,000ft above obstacles over builtup areas; it is not acceptable to conduct prolonged flight at low level during launch or landing procedures.

Interim Recommendation

The Bureau issued interim recommendation IR950093 on 19 May 1995 which stated:

The Bureau of Air Safety Investigation recommends that the Civil Aviation Authority review the rules pertaining to hot-air balloons, particularly in relation to flight below 1,000 ft over populous areas. In conducting this review, the acceptability or otherwise of such operations to the community, should be considered.

CAA Response

The CAA response to IR950093 is stated in part as follows:

"I refer to Interim Recommendation IR950093, Occurrence 9402878 involving VH-AQF on 9/10/94 and concerning the review of rules pertaining to the flight of hot-air balloons over populous areas.

The Authority has examined the circumstances surrounding this occurrence and does not entirely agree with the Bureau's summary of the deficiency. Balloons have no special privilege permitting them to fly at altitudes below 1000 ft over built up areas. They are only permitted to operate below 1000 feet in the same circumstances as aeroplanes, i.e. when approaching a suitable place for a landing or when taking off from a suitable place, in accordance with Civil Aviation Regulations 92(1)(d) and 157(4)(e)

Whilst passengers may have been told that it was normal to cruise at low level and converse with people on the ground, this is not the case during flight over populous areas. The intention is that balloons only fly low to the minimum extent necessary to manoeuvre to a suitable landing area.

It is clear that the operator involved in this accident may have become accustomed to carrying out prolonged cruising flight at low level over populous areas. This practice may have led to the balloon encountering a local windshear effect at a considerable distance from the intended landing site. A lack of currency and situational awareness on the pilot's part are also considered to be factors.

As a result of this occurrence the Authority has issued directions to a number of balloon operators in respect of the conduct of flights over cities, requiring them to define standards of operation, training and currency for their pilots and standards for the launch and landing areas used. The material is currently being reviewed with a view to defining more precisely what is safe, expeditious, and permissible, compared to that which is not permitted or appropriate.

Community perceptions, as well as considerations of the differences between the dynamics of balloon and aeroplane or helicopter flight, will be taken into account in carrying out this review".

This response was categorised by the Bureau as CLOSED-ACCEPTED.