Aviation Safety Investigation Report 198900017

Kavanagh Hot Air Balloon D-105

15 October 1989

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NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

Occurrence Number: 198900017 **Occurrence Type:** Accident
Location: 5km NE of Cessnock Airport NSW
Date: 15 October 1989 **Time:** 715
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None
Crew	1	0	0	0
Ground	0	0	0	-
Passenger	1	0	0	4
Total	**2**	**0**	**0**	**4**

Aircraft Details: Kavanagh Hot Air Balloon D-105
Registration: VH-BOK
Serial Number: KB-027
Operation Type: Charter
Damage Level: Minor
Departure Point: 9 km N of Cessnock Airport NSW
Departure Time: 0600
Destination: 5 km NE of Cessnock Airport NSW

Approved for Release: 28th September 1990

Circumstances:

Towards the completion of a scenic flight with five adult passengers on board, the pilot descended the balloon to a height of approximately 200 feet above ground level and commenced searching for a suitable landing site. His initial selection was subsequently abandoned to avoid frightening an injured horse. The balloon with limited fuel remaining continued at low level, passing over timbered country before commencing a deflated landing into a semi-cleared area. The area was surrounded by tall trees to the left, right and rear of the flight path. A two-wire high voltage set of powerlines located just ahead of the pilot's proposed landing area, were not sighted by a ground retrieval crew member, who was in the vicinity of the landing site and in radio contact with the pilot, nor apparently by the pilot until late into the landing. The passengers had not been briefed to assist in observing for and reporting powerlines. The pilot then issued instructions which his passengers understood to mean that they prepare to exit the balloon basket. When approximately one metre above the ground, the first passenger evacuated the basket followed by the pilot, who had the fabric covered metal parachute vent line wrapped in a spiral around his forearm. With the load reduced the balloon began to ascend. One flying wire supporting the balloon basket at the lower section of the balloon envelope, contacted the powerlines before the balloon descended again. An electrical discharge was heard and one powerline was severed. As the basket neared the ground a second and third passenger exited. The pilot was then observed lying on the ground fatally injured, apparently having received a high voltage discharge via the parachute vent line. The line had then detached from around his forearm. A fourth passenger then vacated the basket, leaving one passenger on board. With the release of the parachute vent line the exhaust vent closed and as there was still sufficient bouyancy retained within the envelope, the balloon slowly re-ascended. When at an

estimated height of 10 metres above the ground, the remaining passenger was observed to fall from the balloon basket and receive fatal injuries. The balloon continued to drift for approximately two kilometres before settling to the ground in heavily timbered country. The pilot's technique of wrapping the parachute vent line around his wrist and forearm would have made rapid deflation difficult. His actions in preparing passengers to jump and his decision to exit the basket prior to landing, were totally alien to the normal and emergency modus operandi. It is believed that a previous similiar type fatal accident involving a balloon colliding with a powerline, may have influenced his behaviour. Subsequent trials indicated that it is extremely difficult to evacuate all passengers from a basket in a short time frame without pre-warning, established drills, and orderly implementation. The weather conditions were calm and clear but the early morning ambient light conditions would have made detection of the powerlines difficult. The area selected for the landing was the only alternative available considering the meteorological conditions and fuel remaining. The size of the area, should have been within the capabilities of the pilot and balloon had there been no powerlines across the flight path. Stringent obstacle clear gradient requirements exist for the selection of take-off sites, but not for landing sites. Despite some instrumentation deficiencies, the balloon and all of its relevant equipment was serviceable, and had been maintained in accordance with approved procedures. Electrical bonding and insulation properties of the balloon were considered to be inherent design deficiencies for this type of aircraft, thereby permitting differing electrical potentials to exist between individual components, particularly in the event of powerline contact.

Significant Factors:

The following factors were considered relevant to the development of the accident

1. The aborted landing to avoid injured stock placed the pilot in an emergency landing situation.

2. The lack of timely detection of powerlines deprived the pilot of vital pre-landing information.

3. The evacuation of the basket prior to touchdown made pilot control of the balloon bouyancy difficult.

4. The pilot could not deflate the envelope before the balloon ascended into the powerlines.

5. Lack of effective electrical insulation and bonding properties facilitated the conduct of the electrical discharge to earth.

6. The pilot received a fatal electrical high voltage charge through the parachute vent line which was wrapped around his forearm.

7. The balloon contained sufficient bouyancy to ascend after the parachute vent line became free and the parachute vent closed.

8. The pilot's actions may have been influenced by a similiar previous accident.

Reccomendations:

It is recommended that the Civil Aviation Authority in conjunction with the Commercial Balloon Operators and the Australian Ballooning Federation, reassess existing requirements for commercial balloon operations and surveillance of standards and in particular give consideration to

1. Initiating a research and development programme into an on-board, electronic, directional, powerline detection device.

2. Redefining the Flight Manual Emergency Landing procedures concerning the briefing of passengers before ground contact, with particular emphasis upon orderly basket evacuation methods.

3. Initiating manufacturer approved methods of reducing the amount of exposed metal and providing electrical bonding of all metal components to achieve a neutral electrical potential difference between any two components.

4. Defining minimum obstacle clear approach parameters and gradients for commercial balloon landing sites consistent with balloon size and prevailing meteorological conditions.

5. Ensuring, as far as is practicable, that at least one member of the retrieve crew is either present at the proposed landing site, or in such other position with unrestricted views, as to be able to brief the pilot of obstacles and assist with rapid deflations and evacuations as required.