Australian Government
Australian Transport Safety Bureau

Hard landing involving a Kavanagh Balloon, VH-CNX

60 km NW of Gold Coast Airport, Queensland on 26 September 2014

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Addendum

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What happened

On 26 September 2014 at about 0450 Eastern Standard Time, the pilot of a Kavanagh Balloon, registered VH-CNX, conducted pre-flight preparations for a charter flight with 22 Chinese passengers. The pilot obtained the weather forecast and, due to forecast winds, elected to depart from Beaudesert, with a planned landing site in Cedar Grove, Queensland. At Beaudesert, the pilot performed a wind test using a helium balloon and observed the wind to be from the west up to about 1,000 ft above ground level (AGL) and southerly above that.

The pilot then briefed the passengers using a briefing card in Chinese. The pilot noted that none of the passengers spoke English and, although they had attended the briefing, he was concerned that they did not understand the instructions or were unwilling to comply. During the inflation process, many passengers had to be reminded to stay clear of the fans.

The pilot started the burners and the passengers embarked. The pilot then conducted a safety briefing including demonstration of the landing position. The passengers then assumed their landing positions and the pilot was satisfied they understood the correct position to adopt when he stated 'landing positions'. After completing the pre-flight checks, the balloon lifted off at about 0550. The 20 minute flight was conducted at about 3,000 ft above mean sea level, with a groundspeed of about 22-23 kt. The pilot then commenced the descent to the landing site and confirmed with the pilot of a company balloon that had landed 5 minutes earlier, that the wind at treetop height was from about 080° at about 8-9 kt and the surface wind 040° at about 6 kt.

During the approach, the pilot observed a light ground fog (Figure 1) and was heading directly into the sun, making the landing site difficult to see. The pilot attempted to obtain an accurate rate of descent from the altimeter, but it was reading erratically. When approaching treetop height, the balloon had a forward speed of about 14.5 kt. The pilot instructed the passengers to put cameras away and adopt the landing position, but not all of them complied. He repeated his instructions to the passengers, the altimeter continued to read erratically and, facing directly into the sun, made visual assessment of the approach difficult.

Figure 1: Landing site showing ground fog

Source: Pilot

On final approach, the balloon had a forward speed of about 9 kt and the pilot repeated the landing instructions to the passengers. The pilot pulled the vent line to descend the balloon and observed a rapid rate of descent. He then put all four burners on full power for about 5 seconds to arrest the rate of descent and repeated his instructions to the passengers. Just prior to touchdown, the pilot operated the rapid deflation system. The balloon landed hard and bounced once before landing about 3 m further along the ground.

The pilot then reset the vent line to close the top of the balloon and reapplied heat to ensure it did not deflate fully. He observed one passenger sitting on the floor of the basket and another indicating a sore back. The pilot immediately spoke to the ground crew via UHF radio and an ambulance was called. Two passengers were taken to hospital by ambulance and another 8 were taken to hospital for assessment. Two were found to have serious injuries, and 7 had minor injuries. One of the passengers sustained injury when two fellow passengers fell onto them having not adopted the correct landing position. The balloon was undamaged. The altimeter reading erratically was found to have been an indication that the battery was going flat.

Pilot comments

The pilot provided the following comments:

- The next suitable landing site was about 20 minutes flying time away by which time the wind was forecast to be significantly stronger therefore aborting the landing was not an option.
- With the sun in his eyes and the fog under the trees, he was relying on the altimeter to determine the rate of descent, however it was malfunctioning.
- A 14 knot forward speed just above treetop height was faster than a normal approach. About 16 kt of forward speed could result in the balloon being dragged about 100 m on landing.
- The rapid deflation system was used for landings above 6 kt.
- If the wind on the ground prior to departure was above 7-8 kt, the flight would be cancelled. On that day the wind on the ground was calm prior to departure.
- He had a spare altimeter in his flight bag but he did not have time to access it prior to landing.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Balloon operator

As a result of this occurrence, the balloon operator has advised the ATSB that they are taking the following safety actions:

- Pictorial safety cards with instructions in Chinese and Japanese will be taken on board the balloon for passengers to review prior to landing.
- A tour leader who speaks fluent English will be requested to accompany groups.
- A backup altimeter will be kept readily accessible in the balloon.

Safety message

In this incident, the combination of moderate wind speed, the position of the sun, equipment issues and non-compliance to instructions by passengers, contributed to increase the pilot workload at a critical phase of flight. The Civil Aviation Advisory Publication (CAAP) 5.59-1(0), *Teaching and Assessing Single-Pilot Human Factors and Threat and Error Management*, describes threat and error management (TEM) as 'the concept applied to managing and maintaining the safety of a particular flight', while risk management is the process of go or no-go decision making. The CAAP is available from the CASA website at:

www.casa.gov.au/scripts/nc.dll?WCMS:OLDASSET::svPath=/download/CAAPs/ops/,svFileName=5_59_1.pdf

Assessing the risk prior to a flight includes obtaining the appropriate weather forecast and deciding whether to conduct the proposed flight. Threats are situations or events that increase the operational complexity, and have the potential to influence the safety of a flight. Threat and error management requires pilots to identify threats and plan and execute countermeasures. The CAAP advises pilots that when confronted by threats (or errors), the priority is to ensure the aircraft is in an appropriate configuration to optimise their ability to maintain control of the aircraft and flight path.

General details

Occurrence details

Date and time:	26 September 2014 – 0620 EST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	60 km NW of Gold Coast Aerodrome, Queensland	
	Latitude: 27° 48.38' S	Longitude: 153° 02.83' E

Balloon details

Manufacturer and model:	Kavanagh Balloons B-400	
Registration:	VH-CNX	
Serial number:	B400-438	
Type of operation:	Charter	
Persons on board:	Crew – 1	Passengers – 22
Injuries:	Crew – Nil	Passengers – 2 (Serious) 7 (Minor) 13 (Nil)
Damage:	Nil	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.