الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

Air Accident Investigation Sector

Accident

- Final Report -

AIFN/0019/2014

Passenger Ejected from Balloon Basket during Landing

Operator:	Balloon Adventures Emirates
Make and model:	Cameron A-450LW
Nationality and registration:	The United Arab Emirates, A6-BAR
Place of occurrence:	Dubai
State of Occurrence:	United Arab Emirates
Date of occurrence:	10 November 2014

Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates

Accident Brief

AAIS Case No.:	AIFN/0019/2014
Operator/owner:	Balloon Adventures Emirates
Aircraft Make and Model:	Cameron A-450LW
Registration Mark:	A6-BAR
MSN:	11809
No. and Type of Engines:	Not applicable
Date and Time (UTC):	10 November 2014, 00:48 UTC
Place:	Dubai, UAE.
Category:	Transport (Passenger)
Persons onboard:	21
Injuries:	1

Investigation Objective

This Investigation is performed pursuant to the UAE Federal Act No. 20 of 1991, promulgating the Civil Aviation Law, Chapter VII, Aircraft Accidents, Article 48; It is in compliance with the UAE Civil Aviation Regulations, Part VI, Chapter 3; in conformity with Annex 13 to the Convention on International Civil Aviation; and in adherence to the Air Accidents and Incidents Investigation Manual.

The sole objective of this Investigation is to prevent aircraft accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

Investigation Process

The occurrence involved a Cameron A-450LW balloon, registration A6-BAR, and was notified to the General Civil Aviation Authority (GCAA) by phone call to the Duty Investigator (DI) Hotline Number +971 50 641 4667.

After the Initial/On-Site Investigation phase, the occurrence was classified as an 'Accident'.

An Investigation Team was formed in line with the Annex 13 obligations of the UAE, being the State of Registry.

The scope of the Investigation into this Accident is limited to the events leading up to the occurrence; no in-depth analysis of non-contributing factors was undertaken.

Notes:

1 Whenever the following words are mentioned in this Report with the first letter Capitalized, it shall mean:

- (Accident) - this investigated Accident
- (Balloon) - the balloon involved in this Accident
- (Investigation) - the investigation into this Accident
- (Operator) - Balloon Adventures Emirates
- (Pilot) - the Pilot of the Accident Balloon
- (Report) - this Accident Investigation Report

2 Unless otherwise mentioned, all times in this Report are 24-hour clock in Coordinated Universal Time (UTC), (UAE Local Time minus 4).

Synopsis

On 10 November 2014, at about 0200 UTC, a Cameron Balloon A-450LW, registration mark A6-BAR, operated by Balloon Adventures Emirates, was conducting a sightseeing flight at Margham, Dubai, with 21 passengers and one pilot onboard. At the end of the flight, and during the landing phase, one of the 21 passengers fell from the Balloon basket to the ground and sustained serious injuries.

The Air Accident Investigation Sector determines that the causes of the Accident were that the passenger was unaware of the landing safety procedure, she did not anticipate the speed and impact of the landing, and during landing sequence, the injured passenger did not hold on properly to the rope handles with both hands, as instructed by the Pilot.

Two safety recommendations were addressed to the operator: enhance the safety procedures for passengers, and confirmation by the pilot prior to landing, that each passenger follows the landing safety procedure correctly.

Abbreviations

AAIS	The Air Accident Investigation Sector
CAR	Civil Aviation Regulation
CoA	Certificate of Airworthiness
CoR	Certificate of Registration
CSN	Cycles Since New
CVR	Cockpit Voice Recorder
ERP	Equipment Restrain Area
FDR	Flight Data Recorder
GCAA	General Civil Aviation Authority of the United Arab Emirates
ICAO	International Civil Aviation Authority
IFR	Instrument Flight Rules
Kt	Knot
MCTOM	Max Certified Take Off Mass
MSN	Manufacturer Serial Number
No.	Number
SOP	Standard Operating Procedure
TAF	Terminal Area Forecast
TSLO	Time Since Last Overhaul
TSN	Time Since New-flight hours
UAE	The United Arab Emirates
UTC	Coordinated Universal Time
VFR	Visual Flight Rules

Contents

List of Tables

List of Figures

1. Factual Information

1.1 History of Flight

On 10 November 2014, at about 0200, a Cameron Balloon A-450LW, registration mark A6-BAR, operated by Balloon Adventures Emirates, was conducting a sightseeing flight at Margham, Dubai, with 21 passengers and one pilot onboard. At the end of the flight and during the landing phase one of the passengers fell from the Balloon basket to the ground and sustained serious injuries.

On the day of accident the Pilot reported for duty at 0115 UTC and checked the Terminal Area Forecast report (TAF). The Pilot then proceeded to the Balloon and he also checked the weather station at the take-off site. The Pilot decided that conditions were suitable for the flight.

Before the passengers boarded the Balloon the pilot, as part of the Standard Operating Procedure (SOP), briefed them. The briefing included take-off and landing safety precautions, and various other safety requirements. The briefing emphasised the importance of wearing the safety harness and explained how to connect the harness to the floor anchor in the basket. The briefing referred to the need for passengers to keep their backs to the direction of flight during landing, and assume a landing position by holding the rope handles in the basket with both hands. The pilot also demonstrated the correct landing position.

After the briefing, the pilot divided the Passengers into two groups for the boarding process. At 0145, the passengers started to board the balloon and at 0200, the pilot contacted Minhad Air Traffic Control (ATC), requesting clearance for take-off.

At about 0212, the Balloon lifted off, and the Pilot requested an altitude of 400 ft, which was approved by Minhad ATC. The flight proceeded uneventfully for approximately 21 kilometres over about 48 minutes.

During the flight, the pilot again provided safety information regarding the correct landing position to the passengers.

The pilot checked and confirmed that all the passengers were taking the correct landing position. He also believed that each passenger had understood and followed his instructions.

Before landing, the pilot requested the passengers to assume the landing position. According to the pilot's statement, all of the passengers had adopted the correct position. This was verified by the in-flight video.

Upon landing, the Balloon bounced a number of times. During the second bounce a 25-year old female passenger lost her balance, and was ejected from the basket. The pilot did not notice that the passenger had been ejected until the balloon finally came to rest. A friend of the passenger immediately left the basket and ran to her aid.

According to the portable Global Position System (GPS) device which was onboard the Balloon, the wind speed was 1 knot (kt) at take-off, maximum climb rate was 689 ft / minute, maximum sink rate was 803 ft/minute, maximum altitude reached was 4,101 ft, the maximum speed of the Balloon was 36 kilometres per hour (19.4 kt), and the landing parameters were within the limits published in the Flight Manual.

1.2 Injuries to Persons

Table 1 shows the injuries. The seriously injured passenger was a sustained a fracture to her back.

Table 1. Injuries to persons

Injuries	Flight Crew	Cabin Crew	Other Crew Onboard	Passengers	Total Onboard	Others
Fatal	0	0	0	0	0	0
Serious	0	0	0	1	1	0
Minor	0	0	0	0	0	0
None	1	0	0	20	21	0
TOTAL	**1**	**0**	**0**	**21**	**22**	**0**

1.3 Damage to Aircraft

The Balloon was undamaged.

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Personnel Information

The Pilot was a 49-year old male, who had approximately 350 flights on type and he held a valid GCAA Medical Certificate.

According to the Employee Balloon Technical Log, the Pilot had flown the same incident Balloon for about one hour almost each day for the previous two months.

1.6 Aircraft Information

Cameron balloons are designed and certified according to EASA CS-31: Certification Specifications for Hot Air Balloons.

Figure 2 illustrates the Balloon configuration.

The Rapid Deflation System (RDS) is a pilot actuated system which opens a section at the top of the balloon to vent the captured hot gases to atmosphere. In the Cameron balloon design, the RDS is actuated by a rope from the pilot's position via a pulley system to the RDS at the top of the balloon envelope.

Table 2 illustrates general data on the Balloon based on the records provided to the Investigation.

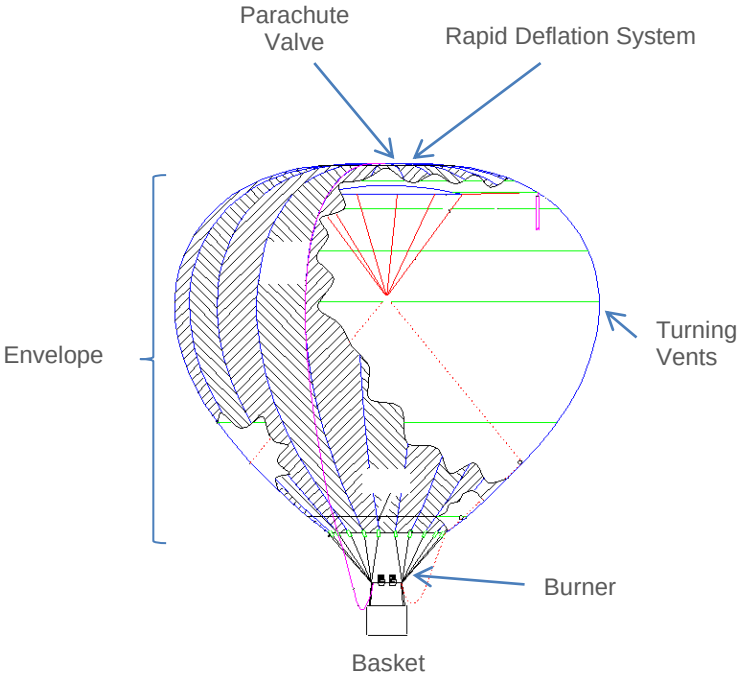

Figure 1. Typical balloon configuration

Table 2. Balloon data	
Manufacturer:	CAMERON BALLOONS, LTD
Model:	CAMERON A-450LW
MSN:	11809
Date of manufacture:	5 March 2014
Nationality and registration mark:	UAE-A6-BAR
Name of the owner:	Balloon Adventures Emirates
Name of the operator:	Balloon Adventures Emirates
Certificate of Airworthiness (CoA)	
Number: Issue date: Valid to:	UAE-COA-0240 12 June 2014 11 June 2015
Certificate of Registration (CoR)	
Number: Issue date: Valid to:	UAE-COR-0729 29 May 2014 Open
Date of delivery	29 May 2014
Total hours since new (TSN)	35.85
Total cycles since new (CSN)	35
Last inspection and date:	10 February 2014
Engines	burner

According to the records provided to the Investigation, there were no reported significant technical defects prior to the Incident. Neither was there any mechanical anomaly prior to takeoff.

1.7 Meteorological Information

The prevailing meteorological conditions were not a factor in this Accident.

1.8 Aids to Navigation

The Balloon was equipped with a portable GPS which was operating normally.

1.9 Communications

The aircraft was equipped with Portable VHF radio communication and a mobile phone. The mobile phone was available to be used in the event that normal VHF communication was not possible.

1.10 Aerodrome Information

The Balloon took off from the Operator's base located in the desert area of Margham, Dubai, UAE.

1.11 Flight Recorders

The Balloon was Equipped with a Flytec 6040 flight instrument.

The instrument constantly calculates the wind at various elevations and generates a wind layer map showing the wind speed and direction on an automatically adjusting altitude scale. The 6040 has a built-in 3D flight recorder that allows downloading of flight data to a PC enabling flight information to be viewed in FlyChart software, or in Google Earth.

1.12 Wreckage and Impact Information

The Balloon was intact.

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this Incident, nor were they required.

1.14 Fire

There was no sign of fire.

1.15 Survival Aspects

During the bounced landing the injured passenger was ejected from the basket onto the desert sand which resulted in her suffering a fractured back.

When the pilot noticed that one of the passengers required medical assistance, he immediately contacted the ambulance service. The ambulance arrived about 30 minutes after the Accident and transported the injured passenger to the hospital.

1.16 Tests and Research

No test and or research were conducted for this occurrence.

1.17 Organizational and Management Information

Balloon flying operations are limited in the UAE because of seasonal variations due to high ambient temperatures, density altitude considerations and localised, regional variations in wind speed and direction. The balloon flying season normally starts in September and ends in June, dependent on the weather, and flying conditions.

1.18 Additional Information

Balloon Passenger Basket Landing Briefing:

Passengers are briefed to turn their backs to the direction of flight and to bend their knees while gripping a rope handle attached to the wall of the basket with both hands, the passengers are secured in the basket by a restraint system.

The passenger restraint system consists of two parts:

1. An anchor that is connected to the basket floor.
2. A belt worn around the waist of the passenger.

Upon the instruction of the pilot the passengers connect the anchor karabiner to the ring on their belt before landing. Each passenger must hold onto the rope handle with both hands for the duration of the landing phase, until the basket stops.

1.19 Useful or Effective Investigation Techniques

This Investigation was conducted in accordance with Part VI, Chapter 3 of the UAE Civil Aviation Regulations, and the AAIS approved policies and procedures, and in conformity with the Standards and Recommended practices of Annex 13 to the Chicago Convention.

2. Analysis

The Investigation into this Incident collected data from various sources for the purpose of determining the causes and contributing factors.

The pilot reported for duty about one hour and 45 minutes before the flight. He was scheduled to operate one flight only. The Balloon was airworthy, and the pilot was rested. The wind speed, sink rate, and landing weight were within the limits published in the *Flight Manual*. In addition, the weather and visibility conditions were normal based on the meteorology report.

The flight was uneventful until the first touchdown. According to the injured passenger's statement, the instruction from the pilot on the landing practice was not clear to her. The injured Passenger said that she expected that the landing of the Balloon would be smooth.

Before the passengers boarded, the pilot briefed them about the take-off, landing and flight safety requirements, and he then demonstrated the landing position. The Pilot briefed the passengers on the landing position and landing practise in English, as it was the common language for all of the passengers. All the passengers stood in a semi-circle during the pilot's safety briefing. As part of the briefing the pilot demonstrated how to latch and unlatch the safety harness.

Briefing passengers about safety actions is a pilot responsibility, there was no specific procedure to check each individual passenger's understanding of the instructions and there was no requirement to individually confirm each passenger's compliance with safety requirements.

The injured passenger had no physical deficiencies that might have affected her hearing, or eyesight, and she understood English. Detailed and specific instructions for landing safety discipline were provided to the passengers by the Pilot. According to SOP Version 1.24 it was not required to check that each passenger was secured by their harness and rope, or that they understood the instructions of the Pilot.

Following the landing briefing given by the Pilot no passenger indicated that they had any problem following his instructions. According to the pilot's statement, all the passengers were standing in the correct position for all flight phases including the landing. This was verified by the in-flight video.

As the Balloon touched down, it bounced several times. This was contrary to the expectation of the passenger who was ejected from the basket. This Passenger had expected a smooth landing. On the second occasion that the Balloon contacted the ground, the injured passenger, who was not holding the rope handles due to her expectation of a smooth landing, lost her balance, and was ejected from the Balloon basket.

The Pilot did not notice that the passenger had been ejected.

Once the Pilot noticed that a passenger was been injured, he immediately contacted the ambulance service and the injured passenger was transported to the hospital.

3. Conclusions

3.1 General

From the evidence available, the following findings, causes and contributing factors were made with respect to this Accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this Investigation, the following sections are included in the conclusions heading:

- **Findings-** are statements of all significant conditions, events or circumstances in this Accident. The findings are significant steps in this Accident sequence but they are not always causal or indicate deficiencies.
- **Causes-** are actions, omissions, events, conditions, or a combination thereof, which led to this Accident.
- **Contributing factors-** are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the Accident, or mitigated the severity of the consequences of the Accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.2 Findings

3.2.1 The Pilot was licensed and qualified for the flight in accordance with the current requirements of the Civil Aviation Regulations of United Arab Emirates.

3.2.2 The Balloon was certificated, equipped and maintained in accordance with the current requirements of the Civil Aviation Regulations.

3.2.3 The Balloon was airworthy.

3.2.4 The Balloon landed normally within the limitations contained in the *Flight Manual.*

3.2.5 The Balloon was serviceable before and after the landing.

3.2.6 The Accident occurred during the landing phase.

3.2.7 The Pilot was fully aware of the Balloon performance and had provided safety instructions to all passengers.

3.2.8 The injured passenger was aware of the safe landing position and practice; however she did not anticipate the speed and impact of the landing.

3.2.9 The injured passenger was not familiar with the landing safety system of the balloon.

3.2.10 The injured passenger, by releasing her grip with one hand of the rope handle, lost her balance and she was ejected from the basket.

3.2.11 The Pilot was not immediately aware that the incident had occurred.

3.2.12 The weather and visibility conditions were good.

3.2.13 The landing area was safe to land for this type of Balloon and the Pilot performed the landing normally.

3.2.14 The injured Passenger was transported to hospital by ambulance.

3.3 Causes

The Air Accident Investigation Sector determines that the causes of the Accident were:

3.3.1 The passenger was aware of the landing safety procedure, however, she did not anticipate the speed and impact of the landing; and

3.3.2 During landing sequence, the injured passenger did not hold on properly to the rope handles with both hands, as instructed by the Pilot.

4. Safety Recommendations

4.1 General

The safety recommendations listed in this Report are proposed according to paragraph 6.8 of *Annex 13 to the Convention on International Civil Aviation*, and are based on the conclusions listed in heading 3 of this Report; the GCAA expects that all safety issues identified by the Investigation are addressed by the receiving States and organizations.

4.2 Final Report Safety Recommendations

The Air Accident Investigation Sector recommends that:

4.2.1 The Operator, to

SR17/2016

Enhance safety procedures for passengers by displaying a safety card in each passenger compartment. The safety card should include appropriate safety precautions together with a description and appropriate diagrams of the typical landing characteristics of a balloon.

SR18/2016

Prior to landing the pilot should confirm that each passenger has followed the landing safety procedure correctly.

This Report is issued by:

The Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates