Aviation Investigation Final Report

Location:	Hartsel, Colorado	**Accident Number:**	CEN18LA309
Date & Time:	August 3, 2018, 08:15 Local	**Registration:**	N2025J
Aircraft:	Cameron A 250	**Aircraft Damage:**	None
Defining Event:	Cabin safety event	**Injuries:**	1 Fatal, 1 Serious, 9 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

The balloon departed on a revenue sightseeing flight with two commercial pilots and nine passengers. Due to the moderate 7- to 8-mph wind, the pilots briefed the passengers to crouch down with their knees bent, hold on to two straps on the basket, face toward the direction of travel, and brace against the side wall for landing. The passengers understood that the basket was expected to tip over after landing. During the landing, the basket touched down in a flat field, bounced several times, and dragged on the ground about 40 to 50 ft. The basket came to a complete stop while upright. During the balloon deflation, the basket tipped over hard, and two passengers fell out of the upper back left compartment; one passenger landed on top of the other. The 65-year-old passenger was seriously injured, while the 73-year-old passenger died as a result of her injuries. Based on the circumstances and the two passengers' position in the upper compartment of the basket, it is likely that they were not actively hanging on to the basket when it tipped over.

Although the balloon manual and the basket manual differ in their guidance on which way the passengers should face during landing, it is unlikely that the injured passengers facing a different direction would have prevented them from falling out of the basket.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The passengers' fall from the basket after landing when the basket tipped over.

Findings

Personnel issues	(general) - Passenger
Environmental issues	Positioning/available space - Effect on personnel
Organizational issues	(general) - Operator

Factual Information

History of Flight

Landing	Nose over/nose down
Landing	Cabin safety event (Defining event)
Landing	Dragged wing/rotor/float/other

On August 3, 2018, about 0815 mountain daylight time, a Cameron Balloons US A-250 balloon, N2025J, landed in an open field about 12 miles east of Hartsel, Colorado. The commercial rated pilot, commercial rated co-pilot, and seven passengers were not injured; one passenger sustained serious injuries and one passenger was fatally injured. The balloon was not damaged. The balloon was registered to Colorado Rocky Ballooning LLC, Dillon, Colorado, and operated by Colorado Hot Air Balloon Rides under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a revenue sightseeing flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed. The local flight departed at 0717.

The responding Federal Aviation Administration (FAA) inspector reported that the balloon departed from a field about 6 miles northwest of the accident site. At the end of the sightseeing flight the pilot landed the balloon in a flat field; during the landing the basket bounced several times and tipped over (figure 1).

Figure 1 – Several ground scars leading up to the basket on its side

When the basket tipped over, two female passengers fell out; one landed on top of the other and both sustained injuries. The first injured passenger, age 65, sustained a broken wrist and experienced shoulder pain, while the other injured passenger, age 73, was administered CPR by two of the other passengers, then was flown to a local hospital.

Several of the other passengers onboard the balloon stated after the accident that pilots provided an initial flight briefing as well as a briefing before landing, which included information about how they should situate themselves in the basket for a safe landing. The pilots instructed them to crouch down with their knees bent, hold onto two straps on the basket, face toward the direction of travel, and brace against the side wall since the landing would be rougher than they might expect. The passengers reportedly understood that the basket was expected to tip over after landing.

Co-pilot Information

Certificate:	Commercial	**Age:**	29,Male
Airplane Rating(s):	None	**Seat Occupied:**	None
Other Aircraft Rating(s):	Balloon	**Restraint Used:**	None
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 20, 2017
Flight Time:	246 hours (Total, all aircraft), 104 hours (Total, this make and model), 2 hours (Pilot In Command, all aircraft), 70 hours (Last 90 days, all aircraft), 42 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	58,Male
Airplane Rating(s):	None	**Seat Occupied:**	None
Other Aircraft Rating(s):	Balloon	**Restraint Used:**	None
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 14, 2018
Flight Time:	1745 hours (Total, all aircraft), 510 hours (Total, this make and model), 40 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	73,Female
Airplane Rating(s):		**Seat Occupied:**	None
Other Aircraft Rating(s):		**Restraint Used:**	None
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Passenger Information

Certificate:		**Age:**	65,Female
Airplane Rating(s):		**Seat Occupied:**	None
Other Aircraft Rating(s):		**Restraint Used:**	None
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

The operator did not report that any of the passengers had a medical condition or physical limitation that would require special precaution or prevent them from riding in the balloon. None of the passengers reported any disqualifying conditions to the operator prior to the flight.

Aircraft and Owner/Operator Information

Aircraft Make:	Cameron	**Registration:**	N2025J
Model/Series:	A 250 No Series	**Aircraft Category:**	Balloon
Year of Manufacture:	2009	**Amateur Built:**	
Airworthiness Certificate:	Balloon	**Serial Number:**	6550
Landing Gear Type:		**Seats:**	
Date/Type of Last Inspection:	November 1, 2017 Annual	**Certified Max Gross Wt.:**	5000 lbs
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:	494.4 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:	Not installed	**Engine Model/Series:**	
Registered Owner:	Colorado Rocky Ballooning Llc	**Rated Power:**	
Operator:	Colorado Hot Air Balloon Rides	**Operating Certificate(s) Held:**	None

The Cameron Balloons US A-250 envelope has an actual volume and effective lift of 250,000 cubic ft, with a maximum gross weight of 5,000 lbs. The balloon was fitted with an Aerostar Classic XII Basket (RB12-119) and equipped with three burners and three 23.5 gallon liquid propane tanks. The basket is designed to hold 12 passengers and one pilot.

The balloon was equipped with a Flytec 3040 balloon flight instrument. The compact device provides altimeter and variometer (indicates rate of climb/descent) readings, wind speed, ambient temperature, remote envelope temperature sensing, envelope temperature alarms, descent alarm, and a real-time clock and stop watch.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.56 inches Hg	**Temperature/Dew Point:**	11°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hartsel, CO	**Type of Flight Plan Filed:**	None
Destination:	Hartsel, CO	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

The pilot's both reported that the wind speed during landing was 7 to 8 mph which is considered moderate wind for this type of operation.

The passengers did not mention any adverse wind conditions in their statements.

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	None
Passenger Injuries:	1 Fatal, 1 Serious, 7 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious, 9 None	**Latitude, Longitude:**	39.005832,-105.576942(est)

After the accident the pilot-in-command (PIC) stated that with the moderate wind they expected the basket to tip over after landing, which was typical for a moderate wind landing. After initial contact the basket dragged on the ground about 40 to 50 ft, then came to rest. The co-pilot then "pulled the top out" to release the hot air and deflate the envelope. The PIC stated that the basket had come to a complete stop, and during the deflation the basket tipped over on its side, came down hard, and the two passengers in the upper left compartment (figure 2) of the basket fell out.

Figure 2 – The basket on its side. The upper left compartment is noted in red.

The responding FAA inspector did not report any malfunctions or anomalies with the balloon or it's components.

Medical and Pathological Information

The El Paso Country Coroner, Colorado Springs, Colorado, performed an autopsy on the passenger and determined that the cause of death was blunt force neck trauma.

Additional Information

Company Operations Manual

The company operations manual stated in part, "Pre-Flight/Pre-Boarding – The chief pilot is to perform a passenger briefing to all passengers prior to boarding the aircraft. This briefing must include all possible landing scenarios including high wind tip over landings, it must explain in detail where to hold on and how to stand during landing and stress that it is essential to their safety that they obey their pilot in commands instructions. Pre-Flight/Post-Boarding - The PIC must once again go over the landing instructions once the passengers have boarded to physically show them where to hold on and how to stand in their particular basket. Prior to Landing - The PIC must evaluate the expected nature of the landing and inform the passengers accordingly. If it is expected to be anything but a feather landing the PIC must show a sense of urgency to get the passengers attention. Once again, show them where to hold on with both hands, how to stand, repeat that they must keep arms and hands in the basket, make sure that they are watching the direction of travel so they know when to brace on contact and repeat again to keep holding on even after the landing until instructed to let go by the PIC and stay in the basket. Upon Landing - The PIC must make sure that the passengers continue to hold on with both hands and to stay in the basket until instructed to disembark. Once safely out of the basket the passengers must be informed to move to the back side of the basket on the upwind side."

The operator stated that he used the Cameron Balloons A-250 flight manual for flight operations. The FAA inspector confirmed that the Cameron flight manual should be used since the envelope is the type certificated portion of the aircraft.

Cameron Balloons A-250 Flight Manual

According to the Cameron flight manual, "passengers are to be briefed on appropriate clothing and footwear to wear to launch site. Passenger health confirmed suitable for balloon flight (ask each passenger about heart condition, possible altitude limitations (for heart or lung problems), general strength, pregnancy, or any physical or medical condition that would make flight inadvisable or require special precautions or equipment). The manual also states in part, "passengers should be briefed to hold on with both hands, knees slightly bent to absorb shock on impact, and to stay down in the basket to prevent being thrown out during the landing. If a stand-up landing is anticipated, the passengers need not brace their bodies against the wall of the basket or against each other. If it will be a high wind landing or a during a rapid vertical descent and it Is expected that the basket may rebound or tip over or drag on a corner, the passengers should be briefed to face away from the direction of flight, hold on to an interior basket handle or tank collar in front in them, and crouch slightly. This position is most likely to prevent them from being thrown from the basket on impact or while dragging."

Aerostar Basket Flight Manual

The Aerostar flight manual stated, "helmets are required for all occupants on board and must be worn during emergency procedures as specified in Section 3 of this manual as well as any other time it is deemed necessary by the pilot-in-command. It is recommended that the minimum guidelines be:

1. Optional for take-offs and landings in winds less than 10 mph (16 KPH),

2. Utilized for all take-offs and landings in winds of 10 mph (1 6 KPH) or greater

3. Utilized for low altitude flight, including take-offs and landings, when wind conditions are gusty or unstable.

It is strongly recommended that helmets be worn for the above conditions as a minimum. The final determination of such utilization remains with the pilot-in-command and he or she must apply these guidelines based on experience and each individual situation as it arises. Passengers must be briefed on their proper use prior to flight. The type of helmet to be utilized is at the option of the pilot, but a helmet marketed by its manufacturer as intended for use with motorcycles, bicycles, mountain climbing or ice hockey is strongly recommended."

The Aerostar flight manual also stated in part, "CAUTION Passengers should be briefed to exact the possibility of "rebound" and a second landing in windy conditions. NOTE Wind conditions will dictate whether or not the panel must be opened for rapid deflation. Moderate to strong wind will require immediate deflation. Continuous tension on actuation line is required for rapid deflation.

Emergency/Hard Landing or High Wind Landing

Descent:

1. Brief passengers to:

a. Put on protective helmets immediately.

b. Face direction of travel.

c. Hold on to basket aluminum superstructure.

CAUTION Do not hold on to suspension cables, fuel lines or fittings. Hand injuries or fuel system damage may result.

d. Bend knees slightly, muscles tense.

e. Observe landing progression.

f. Remain in basket until instructed otherwise.

Landing:

3. Stay in the basket until it comes to rest or a safe exit can be made by all passengers simultaneously."

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Richard Hosker; Federal Aviation Administration; Denver, CO Bret Proud; Federal Aviation Administration; Denver, CO
Original Publish Date:	September 27, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97986

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