

Executive Summary

On May 18, 2014, a Taitung county government CAMERON C-90 hot air balloon, registration B-00008, conduct hot air balloon free flight for “2014 Taitung County Government joint wedding”. It was planned to carry two newly married couple for air tour.

At 0618 hour, it took off from Luye Gaotai, Taitung County with one pilot and two passengers on board. It was planned to fly north bound for 20 to 30 minutes, find a suitable place to land for passenger change. After airborne, it flew toward northwest, north and north east with ground speed between 0 to 4 knots. At 0637 hour, after it reached 2,218 feet height, the pilot began to lower its altitude and maintained low altitude fly. He attempted to land at an open ground near Luye Township tea exhibition center. Due to wind direction change, it was unable to land at planning spot. The balloon resumed climb from 1,247 feet, flew approximately north east direction.

At 0657 hour, it began to descend from the highest altitude of 2,615 feet. The pilot planned to land at the open ground near Luye Township Yung-An elementary school. Again, due to wind direction change, it was unable to land at planning spot. At 0710 hour, it finally landed in an open ground adjacent to industry road at Yung-An village, Luye Township. The open ground was surrounded by barbed wire and betel palm tree. After ground crew arrived, they thought it was difficult for passenger changing, the pilot decided to move hot air balloon to adjacent open ground. He planned to lift the basket a little bit, with two ground crew’s assistance to push the basket to the edge of open ground, then ascend to fly over the betel palm tree and land again.

At 0713 hour, when the basket approaching surrounding fence, ground crew A released his hands when the balloon ascending. The balloon ascended fast due to pay load suddenly reduced. Because ground crew B was back to the barbed wire fence, he did not aware approaching to the fence. He did not release his hands in time, held the handle of basket firmly and followed the balloon ascended. At 0714 hour, when the balloon passing the betel palm trees, the pilot heard ground personnel screamed somebody was hung beneath the basket. The pilot threw the rope and discharged the hot air. The ground crew B fell before the balloon landed. At 0716 hour, the balloon landed. The ground personnel called 119 to send the ground crew B for hospitalization. No other person was injured. The balloon was not damaged.

Aviation Safety Council (ASC) launched investigation according to the Aviation Occurrence Investigation Act after the occurrence. Parties to the investigation included the Civil Aeronautics Administration (CAA) and Taitung county government. The Final Report was reviewed and approved by ASC’s 28th Council Meeting on November 25, 2014.

Findings related to probable causes:

1. Neither CAMERON manufacture nor Taitung county government established the Standard Operating Procedure for balloon ground movement. There were no standard callouts for hand releasing when holding and pressing the basket. The ground crew usually released their hand by instinct.
2. Two ground crew moved the balloon before whole ground team arrived. No discussion was made in advance between pilot and ground crew. The pilot lifted the balloon by increased hot air to pass the betel palm tree without notified the ground crew to release their hands. Ground crew A released his hand without notified ground crew B when the balloon was lifted. Because ground crew B's back was facing to the barbed wire fence, he did not aware approaching to the fence. The balloon ascended fast due to pay load suddenly reduced. Ground crew B did not follow the procedure to release his hands when his feet left the ground. He held the basket's handle firmly when balloon lifted and then fell from 23 feet high and was injured.

Findings related to the risks

1. The first landing site was a closed farm land, barbed wire and betel palm tree surrounded. The second landing site was an opened grass land, but the obstacles such as electric pole, power line and concrete wall was at the south side. According the relevant manual, both places were not suitable landing sites. Although no direct damage was made, but the operational risk increased.
2. Due to poor radio communication, the ground crew did not arrive the landing site when the balloon landed. No direct damage was made. If the ground crew was able to arrive at the landing site before the balloon landed, they can provide the obstacles information around landing site, assist safe landing and ground movement afterward. It will reduce the operational risk.

Safety Recommendations

Civil Aeronautics Administration:

1. Supervise Taitung county government to implement the safety recommendations and disseminate relevant information to other hot air balloon operators.

Safety Action Taken

Taitung county government

The followings are the safety actions taken by Taitung county government in accordance to the propose ASC safety recommendation.

1. Stipulate procedure and guidance for hot air balloon ground movement and provide relevant training to pilots and ground crews.

2. Enhance ground crew's concept to release their hands when their feet left the ground.

Action taken

Hot air balloon ground movement procedures have been put in the Hot Air Balloon Ground Crew Manuel. The contents are followings:

1. After received the landing notification from the pilot, the ground crew should arrive landing site for preparation in advance.
2. A ground crew team for basket holding consists of 4 people.
3. Ground crew should follow the pilot's order directly to move the balloon, passenger exchange and balloon deflation etc.
4. After received the pilot's instruction about the direction of balloon movement, the ground crew team leader should command all four ground crew to conduct the operation of balloon movement.
5. The pilot instruct the ground crew to prepare take-off, while the balloon lift off gradually, the team will make the call out to release the hands, i.e. 1,2,3, release.
6. If the balloon lifting off too fast, the team leader and his crewmember will release their hands by their own judgement. Their feet should not leave the ground under no circumstances.

Three days training will be given to the new ground crew before the activity. Recurrent training will be given to the experienced ground crew as well. It will enhance the proficiency of ground crew. The syllabus includes outdoor training and classroom training. The outdoor training consists of balloon assembly, inflation, ground movement, tethering and balloon following etc. The classroom training consists of balloon flying theory, procedures and guidance etc. Hot Air Balloon Ground Crew Manuel will distribute to every ground crew one day before the training. In order to enhance ground crew's understanding of safety and important cautions, this occurrence will be added into the training syllabus.

3. Enhance the hot air balloon pilot's judgement and consideration about the selection of landing site.

Action taken

The pilot flying guide has been established. It contains the landing site policy and guidance. The pilot and co-pilot will make statistic report in their debriefing after the flight training in the future. It will help the pilot to make their judgement.

4. Utilize the Advanced Java-based Multi-dimensional Display System on the CAA Aeronautical Meteorological Service web site, with more realistic weather information, to achieve better understanding of the weather for the pilot.

Action taken

In addition to CAA Aeronautical Meteorological Service and Helium balloon, Advanced Java-based Multi-dimensional Display System will be used in the future.

5. Evaluate to improve air ground communication system, to reduce communication problem, to lower the possibilities of late arrival of ground crew and other risk.

Action taken

More ground radio base station and high power car radio will be installed during Hot Air Balloon Festival. If poor communication existed between pilot and ground crew, the ground radio base personnel will relay the message. High power car radio will be used during regular commercial flight and training flight.

Full investigation report in Chinese is available for download at <http://www.asc.gov.tw>

Sherry Liu, Engineer
Tel: 89127388-330
Email:sherry@asc.gov.tw