DB-6R, G-CMFS	**Ombersley Court, Worcestershire**	**25 June 2023**	**Accident**

Investigation Synopsis

The pilot was taking part in a balloon competition. One part of the competition involved dropping a marker as close as possible to a target location. The accident occurred whilst the balloon was climbing rapidly away from this target. The balloon envelope collapsed, and the basket descended to the ground, fatally injuring the pilot.

The investigation found the balloon was likely to have suffered a parachute stall. The balloon design, the weather conditions, and the rapid climb are all likely to have contributed to the accident.

Three Safety Recommendations are made to the British Ballooning and Airship Club (BBAC) to: develop an effective reporting culture within the ballooning community; issue guidance on the prevention and recovery from unsafe conditions such as parachute stalls; and issue guidance regarding jettisoning of fuel tanks during an emergency.

Two Safety Recommendations are made to the CAA to: publish guidance on the design, testing and inspection of amateur balloons insofar as these activities relate to unsafe conditions such as parachute stalls; and publish guidance related to the oversight of competition balloon flying.

Safety Recommendation 2024-008

Justification

There is no written guidance or best practice to assist amateur designers in ensuring their balloons avoid features that might impinge on safety, such as the potential for parachute stall. There are no requirements for amateur designers and amateur manufacturers to determine essential performance limits. The finished product is not required to be inspected, and there are no inspection criteria to apply to amateur-built competition balloon designs other than the general criteria that would be applied regardless of type.

Therefore, the following safety recommendation was made:

> **Safety Recommendation 2024-008**
>
> It is recommended that the Civil Aviation Authority publish guidance on the design, testing and inspection of amateur-built balloons to reduce the risk of accidents due to unsafe conditions such as parachute stall.

Date Safety Recommendation made: 16 May 2024

LATEST RESPONSE

Response received: 16 August 2024

The CAA accepts this recommendation and will publish guidance to mitigate the risk of accidents caused by unsafe conditions arising from the design, testing, and inspection of amateur-built balloons. The CAA will liaise with the British Balloon and Airship Club (BBAC) in producing this guidance.

The CAA will provide an update on the actions taken to address this safety recommendation by the end of February 2025.

Safety Recommendation Status **Open**

AAIB Assessment **Adequate**

Action Status **Planned Action Ongoing Update Due** 28 February 2025

Feedback rationale

The AAIB acknowledges the work being done by the CAA and awaits an update by the end of February 2025. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A

Safety Recommendation 2024-009

Justification

Twelve previous parachute stall events were reported to the AAIB during the course of the investigation. These occurred in various balloon types and under similar conditions to G-CMFS, suggesting that the risk was not unique to the DB-6R design. The reports also suggested that a parachute stall is more likely in a climb than in a descent. However, none of these events had been formally reported, meaning that any opportunity to learn from them has not been captured. An effective reporting culture is an important way to improve safety

Therefore, the following safety recommendation was made:

> **Safety Recommendation 2024-009**
>
> It is recommended that the British Balloon and Airship Club routinely communicate the importance of safety reporting to its members to promote an effective reporting culture, capture safety learning and help prevent a recurrence of ballooning accidents and serious incidents.

Date Safety Recommendation made: 16 May 2024

LATEST RESPONSE

Response received: 27 August 2024

The BBAC accepts this recommendation.

The BBAC is committed to fostering a robust safety culture and ensuring the highest standards of safety within the ballooning community. To this end, the BBAC is undertaking the following actions:

1. Regular Communication: a routine schedule will be implemented for communicating the importance of safety reporting to all members. This will include newsletters, email updates, and dedicated sections in the organisation's magazine.

2. Educational Initiatives: The BBAC is developing educational materials and workshops to inform members about the critical role of safety reporting. These initiatives will emphasise how timely and accurate reporting can prevent accidents and improve overall safety.

3. Reporting Mechanisms: the BBAC is reviewing and enhancing its reporting mechanisms to ensure they are user-friendly and accessible. This includes providing clear guidelines on how to report incidents and ensuring confidentiality to encourage more members to come forward.

4. Feedback Loop: The BBAC is establishing a feedback loop where members who report incidents are kept informed about the outcomes and safety improvements resulting from their reports. This transparency will help build trust and encourage continuous participation in safety reporting.

5. Safety Culture Promotion: the BBAC will actively promote a safety culture by recognising and encouraging members who contribute to safety through reporting. This may include awards, acknowledgments in publications, and other incentives. By taking these steps, the BBAC aims to capture valuable safety learning and prevent the recurrence of ballooning accidents and serious incidents. The BBAC appreciates the AAIB's guidance and is committed to enhancing the safety of our operations through effective reporting practices.

6. The BBAC will annually review the success of these measures and adjust or add to them as indicated by its analysis.

The BBAC expects to have established the above list of initiatives by the end of the 2024, although much of this is established already.

Safety Recommendation Status **Open**

AAIB Assessment **Adequate**

Action Status **Planned Action Ongoing Update Due** 31 January 2025

Feedback rationale

The AAIB acknowledges the measures being taken by the BBAC in response to this Safety Recommendation and requests an update on progress by the end of January 2025. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A

Safety Recommendation 2024-010

Justification

The evidence suggested that the pilot of G-CMFS tried to reinflate the balloon by burning through the fabric after the envelope and throat collapsed, which was an action taken by some of those who shared with the AAIB their experiences of a parachute stall. Whilst the AAIB has learned of these parachute stall events in which pilots recovered successfully, the knowledge and best practice has not been collated and published.

Therefore, the following safety recommendation was made:

> **Safety Recommendation 2024-010**
>
> It is recommended that the British Balloon and Airship Club publish guidance on best practice for the prevention of and recovery from unsafe conditions such as parachute stalls.

Date Safety Recommendation made: 16 May 2024

LATEST RESPONSE

Response received: 27 August 2024

The BBAC accepts this recommendation.

The BBAC technical committee has created an initial response document, reference TC2024/0601, to share with its members. This material will be discussed in forthcoming instructor training days and in members workshops. In addition, the subject of parachute stalls will be discussed in forthcoming instructor training days, and the panel of examiners for the BBAC will consider the addition of simulated parachute emergency situations as part of the skills test (formally known as the General Flight Test). In addition, the BBAC DTO and the BBAC panel of examiners will consider the addition of simulated parachute emergency situations as part of the flight training syllabus and the skills test (formally known as the general flight test).

It should be noted that many of the manufacturers do not offer clear guidance on the MLM (minimum landing mass), certainly for smaller sport type envelopes. The MLM is a known factor in terms of parachute behavioural characteristics. The BBAC will approach the manufacturers for help in the clarification of the MLM for each size of envelope they produce.

In terms of the potential for other factors (apart from a parachute stall) that may cause unsafe conditions, this will be further explored and the relevant actions will be taken as appropriate.

Much of the work for this initiative has already been completed with the exception of understanding of actions in the event of unsafe conditions. This will be completed by the summer of 2025.

Safety Recommendation Status **Open**

AAIB Assessment **Adequate**

Action Status **Planned Action Ongoing Update Due** 31 January 2025

Feedback rationale

The AAIB acknowledges the measures being taken by the BBAC in response to this Safety Recommendation and requests an update on progress by the end of January 2025. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A

Safety Recommendation 2024-011

Justification

Jettisoning one of the cylinders to reduce weight, which has been suggested as one possible action a pilot could take in these circumstances, in order to slow the descent, is only likely to be effective in cases when a balloon is still partially inflated and exerting a buoyancy force, which is not the case when in a streamered state. Experienced balloon pilots shared varying opinions with the AAIB on the effectiveness of jettisoning heavy cylinders during an emergency. A lack of guidance on this subject means it is unclear whether this is the best course of action in either an uncontrolled descent due to a parachute stall, or in some other emergency.

Therefore, the following safety recommendation was made:

> **Safety Recommendation 2024-011**
>
> It is recommended that the British Balloon and Airship Club publish guidance material on best practice regarding jettisoning of fuel tanks during an emergency.

Date Safety Recommendation made: 16 May 2024

LATEST RESPONSE

Response received: 27 August 2024

The BBAC partially accepts this recommendation.

The BBAC has carefully considered the Safety Recommendation 2024-011 from the AAIB regarding the jettisoning of fuel cylinders during an emergency.

In UK aviation law (reference the ANO, section 89, Paragraph 3) only water or finely divided sand may be jettisoned from a balloon in free flight. The serious ramifications of jettisoning fuel cylinders has been discussed at length at many safety meetings, and the consensus is that jettisoning of a leaking flight cylinder must never be considered or take place over a congested or inhabited area, as the potential for a more serious incident is very high indeed.

A leaking flight cylinder has the potential for a fire in the basket. Managing the problem of a leaking cylinder can be done by attaching the cylinder to the crown line or handling line, and allowing it to dangle outside the basket. This is also standard teaching, though not captured in any present syllabus.

The action of a jettisoning a cylinder to help reduce decent rate is difficult to give any guidance on as several factors must be considered, including time to ground impact, height above the ground prior to release of a cylinder, and the estimated time required to release the cylinder in the basket.

These issues will be discussed at Instructor training days in the Autumn of 2024 and the spring of 2025, and will be incorporated into other contexts. However, the BBAC does not wish to condone, promote or indeed offer any best practice advice on the jettisoning of fuel cylinders.

Safety Recommendation Status **Open**

AAIB Assessment	**Partially Adequate**
Action Status	**Planned Action Ongoing Update Due** 31 January 2025

Feedback rationale

The AAIB acknowledges the points made by the BBAC and notes that guidance not to jettison fuel tanks (for the reasons given in the response) would meet the intent of the this Safety Recommendation. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A

Safety Recommendation 2024-012

Justification

It is important that competition pilots balance the desire to do well and compete with the need to operate safely. The advice in strong wind gradients, to climb slowly and fly at a relatively heavy weight (which results in an increased pressure in the envelope), can conflict with the desire to push the balloon to its limits to win the competition. It is vital that all competition organisers ensure that this risk is well managed.

Therefore, the following safety recommendation was made:

> **Safety Recommendation 2024-012**
>
> It is recommended that the Civil Aviation Authority publish guidance for the safe oversight of competition balloon flying in the UK, to ensure the risks associated with the activity are appropriately understood by competitors and managed by competition organisers.

Date Safety Recommendation made: 16 May 2024

LATEST RESPONSE

Response received: 16 August 2024

The CAA accepts this recommendation and will publish safety guidance for balloon events to ensure the risks associated with competition balloon flying are understood by competitors and managed by competition organisers. The CAA will liaise with the British Balloon and Airship Club (BBAC) in producing this safety guidance.

The CAA will provide an update on the actions taken to address this safety recommendation by the end of February 2025.

Safety Recommendation Status **Open**

AAIB Assessment **Adequate**

Action Status **Planned Action Ongoing Update Due** 28 February 2025

Feedback rationale

The AAIB acknowledges the work being done by the CAA and awaits an update by the end of February 2025. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A