

INCIDENT

Aircraft Type and Registration:	Piper PA-28-161, G-BORL	
No & Type of Engines:	1 Lycoming O-320-D3G piston engine	
Year of Manufacture:	1978 (Serial no: 28-7816256)	
Date & Time (UTC):	29 June 2022 at 1000 hrs	
Location:	Blackpool Airport, Lancashire	
Type of Flight:	Private	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - 1 (Fatal) 1 (None)	Passengers - N/A
Nature of Damage:	None	
Instructor's Licence:	Commercial Pilot's Licence	
Instructor's Age:	57 years	
Instructor's Flying Experience:	8,876 hours Last 90 days - 184 hours Last 28 days - 78 hours	
Information Source:	AAIB Field Investigation	

Synopsis

A flying instructor, who held a Class 1 Medical, died inflight whilst flying with a qualified pilot. The pilot was able to land the aircraft safely. A post-mortem concluded that the instructor died from acute cardiac failure. The CAA intends to review the circumstance of this incident to determine if anything can be learnt and if any changes should be made to the current guidance.

The circumstances surrounding the occurrence did not fall within the definitions of an accident or serious incident as defined in ICAO Annex 13, however, the Chief Inspector, in exercise of his powers under the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2018, initiated an investigation, treating the occurrence as an incident.

History of the flight

A qualified pilot had planned to fly G-BORL from Blackpool Airport to another airfield but when he arrived at the flying club and checked the latest wind, he decided the crosswind was above his personal limit to fly on his own. Still wanting to go flying so that he remained within the flying club's recency requirements the pilot asked an instructor if he would accompany him for a single circuit. The instructor agreed to fit in the circuit after he finished a trial lesson.

Following the trial lesson the instructor met the pilot in G-BORL and the pilot taxied the aircraft out to the runway. The pilot recalled that during the taxi they were talking normally. He recalled telling the instructor he would keep the aircraft into wind for the power checks and the instructor replying, “looks good, there is nothing behind you”. The pilot did not recall the instructor saying anything else after this point.

The pilot recalled that shortly after takeoff from Runway 28 the instructor’s head rolled back. The pilot knew the instructor well and thought he was just pretending to take a nap whilst the pilot flew the circuit, so he did not think anything was wrong at this stage. He proceeded to fly the aircraft round the circuit. As he turned onto base leg the instructor slumped over with his head resting on the pilot’s shoulder. The pilot still thought the instructor was just joking with him and continued to fly the approach. He landed normally on Runway 28 and started to taxi back to the apron. However, the instructor was still resting on his shoulder and was not responding, and the pilot realised something was wrong. He signalled to the airport fire crew, who happened to be working on the apron, who came to assist. The fire crew and the air ambulance medical crew, who are based at the airport, attempted to revive the instructor but he remained unresponsive and they were unable to save him.

Post-mortem report and medical history

The post-mortem concluded that the instructor died from acute cardiac failure. His coronary arteries showed diffuse atheromatous disease (a condition where the arteries become clogged with fatty substances) and there was a coronary thrombus (blood clot) occluding his left main stem artery. Toxicology showed no significant findings.

He had medical history of hypertensive disease (high blood pressure) and had been taking blood pressure medication since 2002.

Instructor information

The instructor was 57 years old. He held a commercial pilot’s licence with valid single and multi-engine piston aircraft ratings, a valid instrument rating and a flight instructor rating. He was employed as a full-time senior flight instructor. He had accumulated a total of 8,876 flying hours.

He held a valid Class 1 Medical and his last aviation medical was on 10 February 2022, approximately 4 months before the incident flight.

People who had spoken to him on the morning of the incident said he was his normal cheerful self and there were no indications that he was feeling unwell. The three people who had flown with him for the trial lesson just prior to the incident flight said he seemed well and nothing abnormal had occurred.

CAA medical department review

The AAIB requested that the CAA’s medical department review the circumstances of this incident and the instructor’s medical history. They made the following observations:

- *'From the evidence provided, it is likely the individual suffered a cardiac arrest as the aircraft took off. The evidence suggests this was not preceded by any cardiac symptoms and the presentation was consistent with a fatal arrhythmia occurring as the heart muscle was starved of oxygen following the occlusion of a coronary artery.*
- *The individual was known to suffer with high blood pressure, had elevated blood lipids and was overweight. He was a non-smoker and had remained under regular review for hypertension by his GP.*
- *His blood pressure had been treated for more than 10 years and was within regulatory limits. Routine ECGs¹ had also been carried out in accordance with the regulations and these were normal.*
- *The CAA Hypertension guidelines require further investigations if complications or multiple risk factors exist. There was no evidence of complications however the QRISK², as calculated by his GP in January 2022, was 12.2%. At this level, further treatment or investigation may be considered but this had not been carried out at the time of the incident.*
- *The levels of coronary stenosis seen at post mortem were disqualifying. Had he been symptomatic (angina) and investigated, the CAA would not have certified him without treatment (i.e. stenting or bypass).*
- *The CAA continuously reviews the regulation and guidance for aviation medicals in light of the latest research. The CAA intends to review the circumstance of this incident at their cardiac panel to determine if anything can be learnt and if any changes should be made to the current guidance.'*

Other similar events

Cardiac events can be a cause of sudden incapacitation, including death, in both the general population and among aviation personnel. In the last ten years several studies have been published reviewing the risk to commercial aviation of cardiac events in flight crew³. The studies highlight that the risk can never be reduced to zero and that in multi-pilot operations the risk is mitigated by having more than one pilot. However, they suggest that the current medical assessments carried out for flight crew manage the risk to an acceptable level⁴.

Footnote

- ¹ ECG – Electrocardiogram – a test used to measure the heart's rhythm and electrical activity.
- ² QRISK is an assessment tool used to assess an individual's risk of developing cardiovascular disease.
- ³ [1] Evans S., Radcliffe S-A., (2012). The annual incapacitation rate of commercial pilots. *Aviation, Space and Environmental Medicine*, 83(1), p42–49. <https://doi.org/10.3357/ASEM.3134.2012> [accessed January 2023].
[2] Gray G., Davenport E.D., Bron D., et al (2019). The challenge of asymptomatic coronary artery disease in aircrew; detecting plaque before the accident. *Heart*, 105, s17–s24. <http://dx.doi.org/10.1136/heartjnl-2018-313053> [accessed January 2023].
[3] Gray G., Bron D., Davenport E.D., et al (2019). Assessing aeromedical risk: a three dimensional risk matrix approach. *Heart*, 105, s9-s16. <http://dx.doi.org/10.1136/heartjnl-2018-313052> [accessed January 2023].
- ⁴ CAA medical requirements for certification available at <https://www.caa.co.uk/aeromedical-examiners/medical-standards/medical/> [accessed January 2023].

A review of CAA Mandatory Occurrence Reports back to 2005 showed there had been three commercial air transport incidents in the UK where a pilot had suffered a heart attack inflight, but on each occasions the other pilot had been able to land the aircraft safely. There were several general aviation accidents where cardiac events were given as a possible cause although in most cases there was insufficient evidence to confirm if this was the primary cause of the accident⁵.

Analysis

The flying instructor suffered a sudden fatal heart attack as the aircraft was taking off. On this occasion he was flying with a qualified pilot who was able to land the aircraft safely. However, had this occurred on another flight the outcome could have been different.

Cardiac events are a significant cause of sudden incapacitation, including death, in both the general population and among aviation personnel. In multi-pilot commercial air transport the safety risk is mitigated by the second pilot. However, the risk remains for single-pilot operations.

The CAA reported that they continually review their cardiac guidance in light of the latest research. No tests or assessment can give a 100% reliable detection of cardiac issues and any additional tests or assessment presents a risk to the individual of potentially unnecessary loss of licence. A balance needs to be struck between minimising the risk to flight safety and providing fair and reasonable medical assessment of individuals. The rarity of accidents cause by cardiac events in flight suggests this balance is currently about right, and this is continuously being reviewed by the CAA medical department.

Published: 9 February 2023.

Footnote

⁵ The following general aviation accidents which cite cardiac events as a possible cause were reviewed: G-BUWK 4/8/2020, G-ODDS 24/8/2019, G-CFMY 4/5/2019, G-MEPU 28/7/2016, G-VLCC 21/7/2016, G-MYUS 22/8/2012, G-MISS 8/11/2009 and G-ACDJ 18/8/2005.