

DATA SUMMARY

LOCATION

Date and time	11 April 2007; 13:16 h UTC
Site	Near the island of Tabarca (Alicante)

AIRCRAFT

Registration	EC-BMA
Type and model	BEECHCRAFT A23-24
Operator	Private

Engines

Type and model	IO-360-A1B
Number	1

CREW

Pilot in command

Age	59 years
Licence	Private pilot license
Total flight hours	1,500 h
Flight hours on the type	50 h

INJURIES

	Fatal	Serious	Minor/None
Crew			1
Passengers			
Third persons			

DAMAGE

Aircraft	Destroyed
Third parties	N/A

FLIGHT DATA

Operation	General aviation – Private
Phase of flight	Cruising

REPORT

Date of approval	24 October 2007
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1. FACTUAL INFORMATION

1.1. History of the flight

The aircraft took off from Alicante airport at 13:16 UTC on a local VFR flight. It headed to reporting point SUR via the VFR corridor published in the AIP for this airport. At 13:28 the pilot reported engine problems and notified of his intention to land in Tabarca. The aircraft eventually made a water landing 0.5 miles away from the island of Tabarca. The aircraft sank, but the pilot was able to exit the craft and don his life vest.

He was subsequently rescued by a fishing vessel that had witnessed the aircraft's water landing. Once at the port of Santa Pola, he was transported to a clinic where his overall condition was evaluated. He was then taken to the hospital in Elche and admitted for hypothermia.

Meteorological conditions on the day of the accident were good. Visibility was 10 km and the temperature was 18 °C.

Figure 1 shows the path taken by the aircraft.

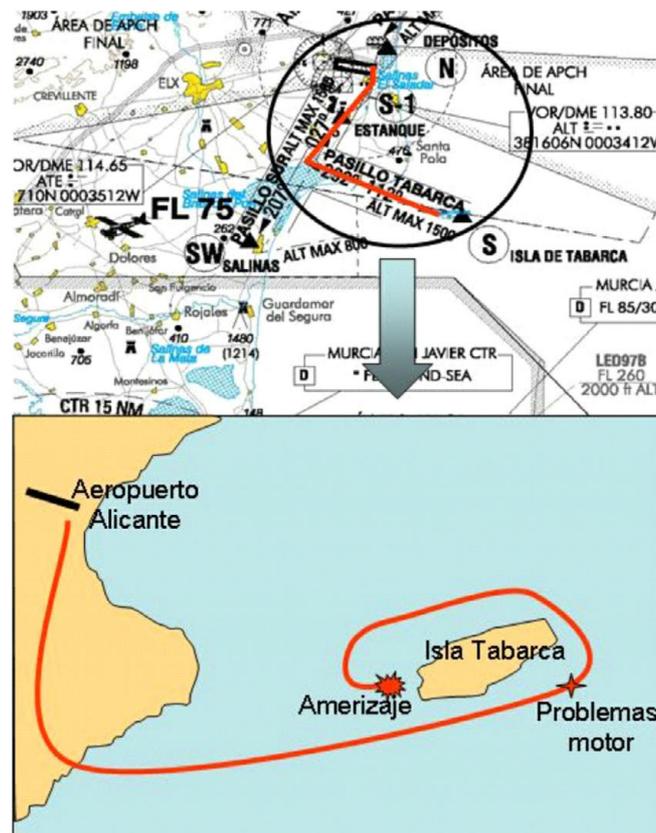


Figure 1. Path taken by the aircraft

1.2. Aircraft information

The aircraft, a Beechcraft A23-24 Musketeer, had a McCauley variable-pitch propeller, model B3D36C429, driven by an IO-360-A1B fuel-injected engine.

The following engine-related maintenance activities had been carried out on the aircraft:

- In November 2005, the engine's cylinders were replaced after corrosion was detected on the cylinder liners. The fuel injector was also replaced for maintaining the engine at idle even after the fuel was cut off. The aircraft had 2,011 hours and 35 minutes of flying time.
- In March 2006, the propeller starter ring gear was dismantled after a tooth was found damaged, which resulted in the starting motor pinion being replaced. At that time the aircraft had 2,046 hours and 25 minutes of flying time.
- In July 2006, both magnetos were replaced after reaching their useful service life. The engine also underwent a special inspection to extend the calendar inspection interval. The aircraft had 2,046 hours and 25 minutes of flying time.
- On the day of the accident the aircraft had 2078 hours and 24 minutes of flying time.

1.3. Wreckage and impact information

The aircraft ditched 0.5 miles away from the island of Tabarca. The pilot had turned off the engine prior to the landing and thus the propeller was undamaged. The most significant damage was to the forward part of the underside of the fuselage.

The left wing had lost one of its outboard lights and the rivets on the left flap had broken off, possibly indicating a slight roll to the left at the time of impact with the water.

1.4. Survival aspects

According to information provided by the pilot, when he realized the ditching was imminent he unbuckled his harness and moved to the RH seat, since there was no door on the left side, opened the door and turned off the engine. He then pulled up on the stick so the aircraft would impact the water with its underside.

The pilot received a blow to the head as a result of the impact, since he did not fasten his harness after moving to the RH seat. He then grabbed a life vest and put it on before exiting the aircraft. The aircraft sank slowly, and the pilot was rescued by a fishing vessel in the vicinity that had seen the aircraft fall to the water.

1.5. Tests and research

The aircraft sank in water some 25 meters deep, which facilitated its recovery. It was taken to the port in Alicante.

The initial inspection was carried out at the port in Alicante. Since the pilot had reported engine problems, it was verified that the aircraft did in fact have fuel and that the fuel lines were not clogged. No anomalies were noted during the inspection.

The engine was later dismantled at the headquarters of the Civil Aviation Accident and Incident Investigation Commission. No damage was found during the dismantling which could have accounted for an engine malfunction. The engine was in good condition and showed no impact marks.

Of particular interest during the dismantling was the alternative air tube, which seemed to channel air from number 2 cylinder's cooling fins to the engine intake. One of the tube's ends was in contact with the engine intake, which was keeping the fuel injector's spring-loaded door open. Figure 2 shows the as-found condition of the tube.

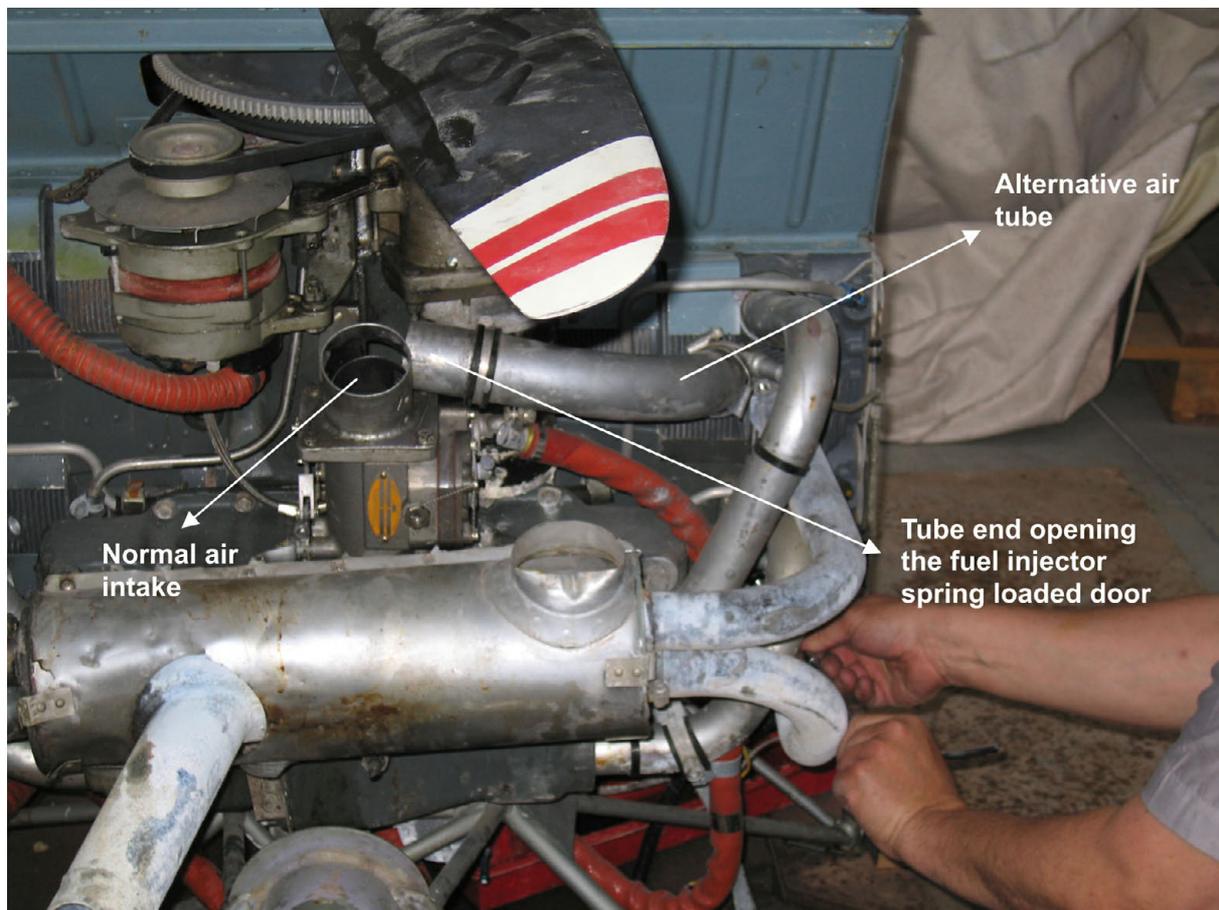


Figure 2. Alternative air tube

After being asked about the tube, the engine manufacturer reported that the component was not part of the engine itself, but was installed by the aircraft manufacturer.

The airframe manufacturer was also consulted, and stated that this alternative air tube was used in case of icing in the intake system. It confirmed that the fuel injector spring-loaded door was normally spring closed, and that when the normal intake was clogged, the pressure difference forced the spring-loaded door open and admitted air to the cylinders through that tube so as keep the engine from stalling.

The aircraft manufacturer also provided information on said tube's installation. Specifically, it stated that in order to install it, the tube's length and shape had to be shop developed prior to attaching it with three MS21219-DG clamps. The ends of the tube had to be 2 inches away from the alternative air inlet port and 0.5 inches away from the cylinder head. This description did not match the actual installation conditions in the aircraft, as seen in Figure 3.

Note in the figure how the tube is more than 0.5 inches away from the cylinder head and that one of the clamps, in addition to being incorrectly installed, is not of the specified type.



Figure 3. Alternative air tube installation

If the fuel injector inlet spring-loaded door is open, the incoming air is at a higher temperature than outside air, which reduces engine power. Specifically, for every 10 °F increase in intake air temperature above that normally found at flying altitude, engine output drops by 1%, according to information provided in the engine documentation.

In July 2006 the magnetos were replaced, which required taking the cowlings off the engine, though the maintenance personnel, when asked about this, assured that the alternative air tube had been installed so as not to open the fuel injector spring-loaded door.

The fuel injector, which was removed and sent to the manufacturer, was also verified to be operating properly. No anomalies which could have resulted in a malfunction were noted during its inspection.

1.6. Additional information

1.6.1. Pilot's statement

The pilot noted a drop in rpm's from 2,200 to 1,800 or 2,000 rpm a few minutes into the flight, while at level flight with an airspeed of 90 kt and 1,000 ft above the ground and in visual flying conditions. He advanced the power and propeller levers and leaned the mixture in an attempt to solve the problem. When the engine did not recover power and the aircraft started to descend, he decided to shut down the engine and prepare for a ditching.

2. ANALYSIS

The disassembly of the engine revealed that the alternative air tube was not in the correct position; it was opening the alternative air spring-loaded door to the fuel injector. This may have been due to the improper installation of the tube or to a shift in position resulting from a jolt which moved the alternative air tube from its initial position.

When the tube was inspected, it was noted that the assembly was inconsistent with the manufacturer's instructions, in that a wrong clamp was used and the tube was not attached as specified in the instructions. Maintenance personnel, however, assured that the tube was properly situated during the last engine maintenance activity performed in July 2006, meaning that, for some reason, between that date and the time of the accident, the tube had probably shifted position and opened the alternative air spring-loaded door on the fuel injector.

In any case, the admission of hot air to the engine would only result in a drop in power, and not a stoppage of the engine.

It is likely that after noticing the drop in rpm's, that the pilot tried to regain engine power but was unable to do so since the engine was still taking in hot air and since he was flying at a low altitude, he decided to shut down the engine and prepare for a ditching.

The cause of the accident, therefore, is considered to be the admission of hot air to the engine while in flight, resulting in a loss of power from which the pilot could not recover.