

CIAIAC

Comisión de Investigación
de Accidentes e Incidentes
de Aviación Civil

TECHNICAL REPORT

A-055/1998

Accident involving
a CESSNA 172 N
aircraft, registration
D-EEYH, in Sierra
Bermeja, near Casares
(province of Malaga)
on December 8, 1998



MINISTERIO
DE FOMENTO

Technical report

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Foreword

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances in which happened the event being investigated, with its causes and its consequences.

In accordance with the provisions of Law 21/2003 and Annex 13 to the Convention on International Civil Aviation, the investigation has exclusively a technical nature, without having been targeted at the declaration or assignment of blame or liability. The investigation has been carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report has originally been issued in Spanish language. This English translation is provided for information purposes only.

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Abbreviations

00 °C	Grados centígrados
00° 00' 00"	Grados, minutos y segundos
AENA	«Aeropuertos Españoles y Navegación Aérea», ATC services provider
AGL	Above Ground Level
ATC	Air Traffic Control
CVR	Cockpit Voice Recorder
DH	Decision Height
DME	Distance Measuring Equipment
E	East
ECAM	Engine and Crew Alerting Monitoring
FDR	Flight Data Recorder
ft	ft
g	Acceleration of the gravity
GPWS	Ground Proximity Warning System
h: min: seg	Hours, minutes and seconds
hPa	Hectopascal
IAS	Indicated Airspeed
IFR	Instrument Flight Rules
KCAS	Knots of calibrated airspeed
Km	Kilometers
Kt	Knots
Kw	Kilowatt
lbs	Pounds
LH	Left
m	Meters
mb	Milibars
METAR	Aviation Routine Weather Report
MHz	Megahertz
N	North
N/A	Not affected
MN	Nautical mile
P/N	Part Number
RH	Right
S/N	Serial number
TOGA	Takeoff-go around
TWR	Control Tower
U T C	Universal Time Coordinated
VMC	Visual Meteorological Conditions
W	West

1. FACTUAL INFORMATION

1.1. History of the flight

The CESSNA aircraft, model 172 N, registration D-EEYH, took off from Malaga airport at 13:21 hours UTC on December 8, 1998, with the pilot and two passengers on board, in order to make a non-commercial local flight under VFR rules. According to the flight plan, the flight was due to last two hours and fifteen minutes and the aircraft was to land at the same aerodrome. It had been fuelled for an endurance of four hours thirty minutes.

The last communication with the aircraft, by VHF radio, was with the control tower of Gibraltar airport at 14.15 hours UTC, in which the pilot took his leave on heading back for Malaga, after making a few authorised passes over Gibraltar airport, the last one at an altitude of 300 feet.

Subsequently, given the delay in the aircraft's return, and once the apron and the possible alternate aerodromes (Cordoba and La Axarquía) had been checked, the relevant alert phases were declared and SAR was notified and given the geodetic coordinates corresponding to the aircraft's last radar position. This information made it possible for the aircraft to be located early in the morning of the following day (8.50 hours UTC of 9/12/98).

The aircraft had crashed into an area of large rocks in Sierra Bermeja, near the municipality of Casares. It was destroyed and unfit for salvage. The crew of the rescue helicopter reported that two of the occupants were found dead and the third seriously injured and with symptoms of frostbite in the limbs.

1.2. Injuries to persons

Injuries	Fatal	Serious	Minor/none
Crew	1		
Passengers	1	1	
Others			

1.3. Damage to aircraft

As a result of the impact with the ground, the aircraft was totally destroyed.

1.4. Other damage

The damage caused to the crash area was deemed to be slight given that there was no fire and the area was largely rocky and treeless with mountainside vegetation.

1.5. Personnel information

1.5.1. *Pilot in command*

Age: 50 years old
Nationality: German
Qualification: Private Aeroplane Pilot Licence
First licensed: 26-09-1994
Flying licence:
— Renewal date: 16-09-1998
— Expiry date: 26-09-2000
Ratings:
— Single-engine landplanes of up to 2,500 kg
— Onboard German and international radio-telephonist
Total flying hours: 81 hours, 52 minutes
Hours on type: 9 hours, 5 minutes
Hours last 90 days: 8 hours, 45 minutes
Hours last 30 days: 6 hours, 51 minutes
Hours last 48 hours: 1 hour, 58 minutes

1.6. Aircraft information

1.6.1. *Airframe*

Make: Cessna Aircraft Company
Model: 172 N
Production no.: 172-68757
Year of manufacture: 1977
Registration: D-EEYH
M.T.O.W.: 1,043 kg

Owner: Alondra Brillenvertrieb GmbH
Operator: Sevetronics, S. L.

1.6.2. *Airworthiness certificate*

Number: L 20439
Type: Category: private
Date of issue: 08-08-1996
Renewal date: *
Expiry date: *

1.6.3. *Maintenance record*

Total flight hours: 4,048 hours, 19 minutes at 05-12-1998
Last 100 h inspection: 18-11-1998
Hours since last 100 h inspection: 17 hours, 12 minutes at 05-12-1998

1.6.4. *Engine*

Make: LYCOMING
Model: O-320-H2AD
Power: 160 HP (119 kW)
Serial number: L-2848-76T
Total flight hours: Unknown. Fitted in the aircraft in April 1996 following a general overhaul.
Hours since last overhaul: 258 hours, 19 minutes at 5/12/1998 (running hours since the engine was installed), according to the Aircraft Log. The Log states that a general engine overhaul is required in April 08 or after 5,879 hours.
Last 100 h inspection: 18-11-1998
Hours since last 100 h inspection: 17 hours, 12 minutes at 5-12-1998

* According to German rules, the certificate remains valid as long as the aircraft is maintained and operated according to the applicable regulations and operating restrictions.

1.7. Meteorological information

The weather report provided by the National Meteorological Institute (INM) states that the conditions in the Malaga area on the day of the accident were suitable for VFR flights with «clear skies except for a few cloudy intervals in the vicinity of the straits (of Gibraltar) and Melilla... Easterly breeze, generally gentle. Moderate east wind in the straits of Gibraltar».

The report mentions the presence of «slight cloud at 1,500 feet and scattered cloud at 2,000 feet and visibility of 10 km or more, with haze» over Gibraltar airport at 14.00 hours UTC.

The report's conclusion states that «according to the above data, in Casares-Sierra Bermeja at the time of the accident the sky may be expected to have been slightly cloudy with gentle easterly winds and good visibility».

1.8. Aids to navigation

Although the navigation aids installed in the aircraft are not considered pertinent to the investigation of this accident, it may be noted that the plane was equipped with an ADF, a VOR VHF-NAV device and a transponder.

1.9. Communications

The aircraft was equipped with VHF communications equipment which was used in its contacts with the Malaga control tower during take-off and with the Gibraltar control tower when the pilot requested permission to make the passes over runway 27. Moreover, in these contacts the pilot made repeated use of the practice of signalling agreement with two clicks of the transmitter, which, though not an official practice, may be regarded as evidence of his familiarity with the way in which communications systems are used.

1.10. Flight recorders

The aircraft had no flight recorders. They are not mandatory in this type of aircraft.

1.11. Wreckage and impact information

The accident occurred when the aircraft hit a large rock on the upper slopes of a mountain of a height of approx. 800/1,000 m.

The first impact was with the right wing, causing it to break away from the fuselage and making the aircraft swing round on its vertical axis so that it finished in a position practically opposite to the direction of flight. As the aircraft swung round the engine broke away, ending up some 20 metres from the forebody; the fuselage crashed into the wing, partially breaking up, and the undercarriage broke away at its socket.

The wreckage was largely clustered together, except for the engine, and there was no other notable damage.

1.12. Medical and pathological information

The aircraft's occupants were recovered early in the morning after the accident by the SAR helicopter that found the wreckage. Two of the occupants (the pilot and one of the passengers) were found to be dead and the third was seriously injured with multiple trauma and symptoms of frostbite in the limbs.

1.13. Fire

There was no fire.

1.14. Survival aspects

Owing to the delay in the aircraft's arrival at Malaga airport, and once the apron and the possible alternate aerodromes (Cordoba and La Axarquía) had been checked, the mandatory alert phases were declared: INCERFA, ALERFA and DETRESFA, at 16.23, 16.54 and 18.19 hours UTC respectively. SAR was notified and given the geodetic coordinates corresponding to the aircraft's last radar position. This information made it possible for the aircraft to be located early in the morning of the following day (8.50 hours UTC of 9/12/98).

Given the nature of the accident, the place where it occurred —mountainous and remote— and the time it took for the aircraft to be found, the probability of survival may be said to have been very low. But one of the passengers was rescued alive, albeit with multiple trauma and symptoms of frostbite in the limbs.

2. ANALYSIS

2.1. Progress of the flight

The aircraft took off from Malaga airport at 13.21 hours UTC to make a non-commercial flight of a general nature under VFR rules with the pilot and two passengers on board. According to the flight plan, the flight was due to last 2.15 hours. The aircraft had an endurance of 4.30 hours and was to return to the same aerodrome.

The weather conditions were suitable for the planned type of flight under VFR rules, with good visibility and clear skies, generally speaking, albeit with slight or scattered cloud in the area and at the altitude of the accident.

The only subsequent information is that the aircraft contacted the control tower of Gibraltar airport, over which it made a number of passes simulating approaches over runway 27. The last of these was authorised at 13.46 hours UTC, to be made at an altitude of 300 feet over the runway.

The pilot took his leave of the Gibraltar control tower at 14.15 hours UTC, reporting the aircraft's position as south of Estepona (province of Malaga).

This was the last radio communication with the aircraft.

It is worth noting that, during the connection with the Gibraltar control tower, as mentioned earlier, the pilot repeatedly used a double click on the aircraft's transmitter button to indicate agreement.

As is well known, the use of this signal is not a formally recommendable or accepted practice, but it is used by some pilots and in this case it shows the pilot's familiarity with the way in which communications systems are used. This point is also demonstrated by the fact that the greater part of his flying experience had been in take-offs and landings made at a civil airport in his country of origin (Germany), at which he would necessarily have had to make use of radio communications. According to his flight card, he had made 422 landings in 132.40 flying hours accumulated up to the day prior to the accident, including hours as pilot in command, trainee and passenger in general aviation.

Considering this familiarity and experience with communications and given that no other communication was received from the aircraft, it is considered that, except in the very unlikely event of a communications failure prior to the accident, no malfunction can have occurred on board and the accident must have happened as a result of an impact against the mountainside when its height or distance from the aircraft was incorrectly judged, either as a dangerous manoeuvre was deliberately being performed at low altitude over the mountainside or, more probably, as a result of the presence of clouds.

The impact was on the right wing against a rock, causing the aircraft to swing round on its vertical axis, with the wing breaking off from the fuselage and the engine coming away and being thrown a distance of 20 metres, as indicated in section 1.3. The figures in Appendix B show photographs of the wreckage.

The aircraft was located by SAR early in the morning of the following day, by means of extrapolating its possible geodetic position from its last radar position at 14.22:17 hours UTC on the day of the accident. Its occupants were recovered by helicopter (two dead and one badly injured). The figure in Appendix A shows the aircraft's radar trail at 13.57:13 hours UTC and 14.22:53 hours UTC on the day of the accident overlaid on a map of the area.

3. CONCLUSIONS

3.1. Findings

- The pilot had a valid Private Pilot's Licence with ratings for the general/non-commercial type of flight that he was making.
- The aircraft had an Airworthiness Certificate, issued on 08/08/1996 by the Federal Civil Aviation Office of the Federal Republic of Germany (LBA), so the aircraft may be assumed to have been airworthy provided that it had been maintained and operated in accordance with the relevant regulations and limitations.
- On 18/11/98 the aircraft underwent a 100-hour inspection within the stipulated period with satisfactory results.
- The weather conditions were suitable for VFR flights, with generally good visibility and clear skies, albeit with slight to scattered cloud in some mountain areas.
- The aircraft collided with the top of a mountain in Sierra Bermeja for reasons unknown.

3.2. Causes

It has not been possible precisely to determine the cause of the accident, although it is considered that the most likely cause is collision against the ground with no loss of control as a result of an incorrect estimation of the aircraft's actual flying height over the mountainside, or as a result of a deliberate manoeuvre, or owing to the existence of cloud on the mountaintops.

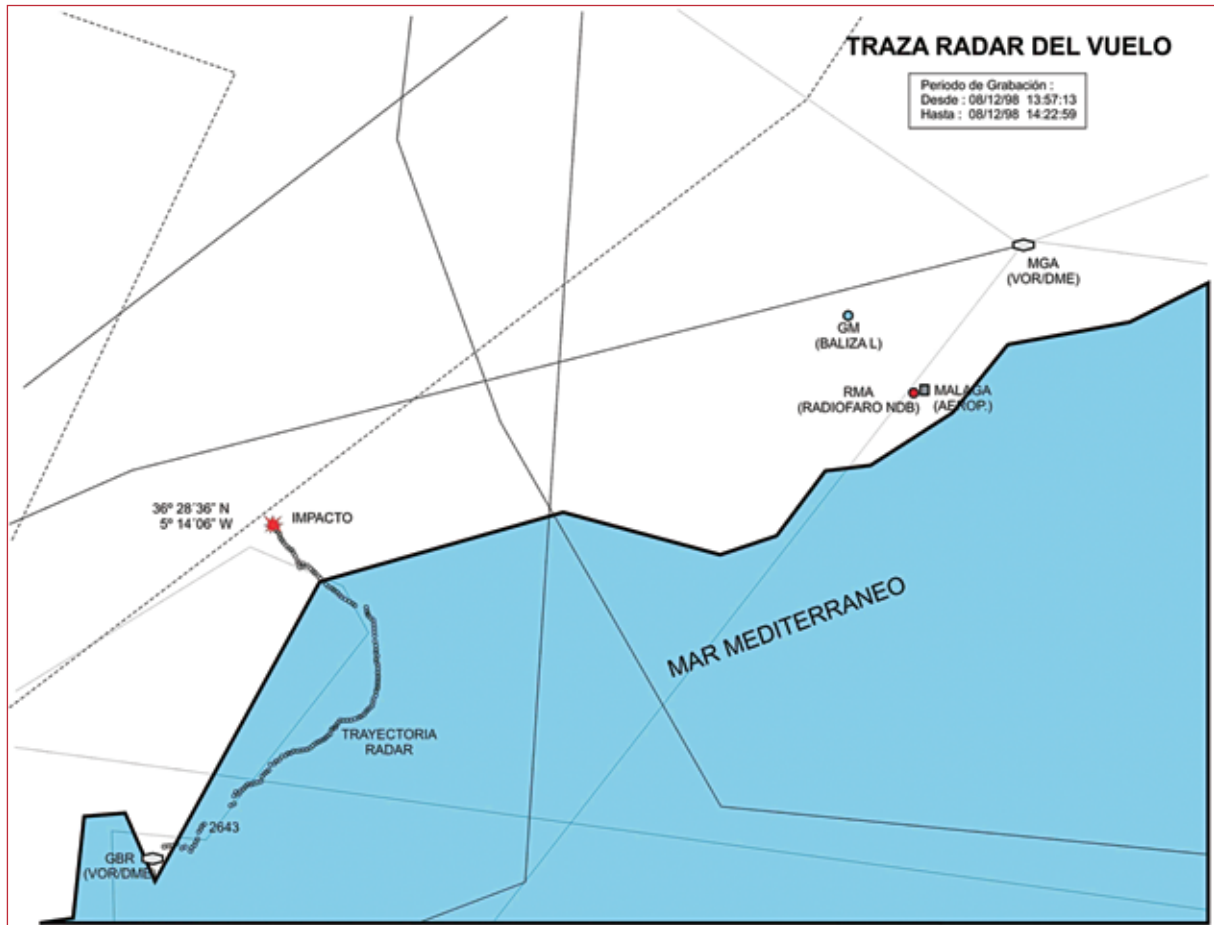
4. SAFETY RECOMMENDATIONS

None.

APPENDICES

APPENDIX A

Radar track of the flight



APPENDIX B

Photographs



View of the aircraft wreckage



Position of the engine