Australian Government
Australian Transport Safety Bureau

In-flight breakup – Cessna Aircraft Company C210M VH-WBZ

100 km NNW Roma, Queensland | 7 December 2011

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2011-160
Final

Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY REPORT

Aviation Investigation

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In-flight breakup
100 km NNW Roma, Queensland
7 December 2011
VH-WBZ
Cessna Aircraft Company C210M

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SAFETY SUMMARY

What happened

On 7 December 2011, the owner-pilot of a Cessna 210M, registered VH-WBZ, was conducting a private flight under the visual flight rules from Roma to Dysart in Queensland. Thunderstorms with associated cloud, rain and severe turbulence were forecast for the area. About 30 minutes into the flight the outer sections of the wings and parts of the tail separated. The aircraft collided with terrain, fatally injuring the pilot.

What the ATSB found

The ATSB established that the aircraft was structurally sound before the wing and tail sections separated. No aircraft system defects were identified. Ground-based weather radar showed thunderstorms in the vicinity of the accident site, and recorded engine data showed cruise power setting was maintained until recording ceased. Although the precise circumstances leading up to the accident were not known, a combination of aircraft airspeed with the effects of turbulence and/or control inputs generated stresses that exceeded the design limits of the aircraft structure.

Safety message

Airspeed is a critical factor in the stress sustained by an aircraft. Pilots need to be aware of the manoeuvring speed (V_A) for the aircraft weight, and to control the airspeed so as not to exceed that value when full control deflection is required or severe turbulence or wind/gusts are encountered.

Severe turbulence and wind gusts are just some of the hazards prevalent in and around thunderstorms. This accident is a reminder to all pilots that, to minimise the risk of structural damage or loss of control, thunderstorms should be avoided.

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In-flight breakup – 100 km NNW Roma, Queensland – 7 December 2011, VH-WBZ, Cessna Aircraft Company C210M

Prepared by

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THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes appropriate, or to raise general awareness of important safety information in the industry. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

TERMINOLOGY USED IN THIS REPORT

Occurrence: accident or incident.

Safety factor: an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence. Safety factors include the occurrence events (e.g. engine failure, signal passed at danger, grounding), individual actions (e.g. errors and violations), local conditions, current risk controls and organisational influences.

Contributing safety factor: a safety factor that, had it not occurred or existed at the time of an occurrence, then either: (a) the occurrence would probably not have occurred; or (b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious, or (c) another contributing safety factor would probably not have occurred or existed.

Other safety factor: a safety factor identified during an occurrence investigation which did not meet the definition of contributing safety factor but was still considered to be important to communicate in an investigation report in the interests of improved transport safety.

Other key finding: any finding, other than that associated with safety factors, considered important to include in an investigation report. Such findings may resolve ambiguity or controversy, describe possible scenarios or safety factors when firm safety factor findings were not able to be made, or note events or conditions which 'saved the day' or played an important role in reducing the risk associated with an occurrence.

Safety issue: a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.

Risk level: the ATSB's assessment of the risk level associated with a safety issue is noted in the Findings section of the investigation report. It reflects the risk level as it existed at the time of the occurrence. That risk level may subsequently have been reduced as a result of safety actions taken by individuals or organisations during the course of an investigation.

Safety issues are broadly classified in terms of their level of risk as follows:

- **Critical** safety issue: associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken.
- **Significant** safety issue: associated with a risk level regarded as acceptable only if it is kept as low as reasonably practicable. The ATSB may issue a safety recommendation or a safety advisory notice if it assesses that further safety action may be practicable.
- **Minor** safety issue: associated with a broadly acceptable level of risk, although the ATSB may sometimes issue a safety advisory notice.

Safety action: the steps taken or proposed to be taken by a person, organisation or agency in response to a safety issue.

FACTUAL INFORMATION

Sequence of events

On 7 December 2011, the owner-pilot of a Cessna Aircraft Company C210M aircraft, registered VH-WBZ (WBZ), intended to fly from Roma to Dysart, Queensland. The private flight without passengers was to position the pilot for non-aviation work at Dysart the following day.

At about 1100 Eastern Standard Time[1], the pilot attended a dental appointment in Roma. At 1400, he logged onto the National Aeronautical Information Processing System (NAIPS) to access weather information. Although the pilot entered basic flight details to obtain route-specific information, he did not nominate a SARTIME[2] or leave a Flight Note[3] with a responsible person. There was no formal requirement to lodge a SARTIME or a Flight Note, but pilots are regularly urged to do so.

At 1445, the pilot refuelled the aircraft with 214 L of Avgas. About 20 minutes later, the pilot transmitted that he was taxiing, but with the call sign of a different aircraft (also used for subsequent transmissions).[4] At 1510, the pilot transmitted departure details including an intention to climb to 6,500 ft above mean sea level (AMSL). At 1513, the pilot liaised with aircraft traffic by radio, indicating that he was passing 4,300 ft. That was the pilot’s last recorded radio transmission.

Recorded engine data downloaded by the Australian Transport Safety Bureau (ATSB) indicated normal engine operation and cruise power until 1545, when the data recording ceased. No other information about the conduct of the flight was available.

The aircraft did not arrive in Dysart as expected, and the Rescue Coordination Centre (RCC) was advised at 0750 the next morning. The RCC initiated and managed a search that identified brief 406 MHz emergency locator transmitter (ELT) signals and derived position information from onboard mobile phone signals. Just after 1600 on 8 December 2011 the aircraft wreckage was sighted about 100 km north-north-west of Roma (19 km north-north-east of Injune). The pilot was fatally injured.

Pilot information

The pilot held a Private Pilot (Aeroplane) Licence issued in 2005, with the appropriate endorsement for single-engine, retractable, manual-propeller-control aircraft such as the C210. Although the pilot had recently undergone some training

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1 Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

2 Time nominated by a pilot for the initiation of Search and Rescue action if a report from the pilot has not been received by the nominated unit.

3 A note prepared by a pilot detailing the planned route and timing for a flight. The pilot leaves this note with a responsible person to notify appropriate authorities in event that the flight is overdue.

4 Pilots use the phonetic pronunciation of an aircraft’s registration as their call sign during radio transmissions. In this case, the call sign would normally be ‘Whiskey Bravo Zulu’.

for a Night VFR Rating, at the time of the accident the pilot was qualified for Day VFR operations only.

The pilot had owned and operated WBZ since June 2011 and since then had logged 150 hours, all of which were in that aircraft. In September 2011, the pilot satisfactorily completed a flight review, which included full and limited panel instrument flight sequences and recovery from simulated unusual attitudes.

The pilot held a Class 2 Medical Certificate with a requirement for reading correction to be available.

Medical and pathological information

The pilot was prescribed medication for the management of heart risk factors with the knowledge of the Aviation Medicine Section of the Civil Aviation Safety Authority (CASA).

The dentist who conducted an emergency root canal procedure on the morning of the accident advised that a local anaesthetic was administered before the procedure and an antibiotic paste was applied during the treatment. No other medication was prescribed by the dentist.

The *Designated Aviation Medical Examiner's Handbook* stated that medical certificate holders required a clearance from a medical practitioner following the administration of any anaesthetic agent. Following administration of local anaesthetic, a minimum of 12 hours was specified before resuming flying duties.

The handbook also stated that medical certificate holders could continue to fly when taking antibiotics, provided the prescribing medical practitioner had determined there would be no adverse drug reactions. In addition to the effect of any medication, the handbook advised that the underlying condition must also be considered.

At the time of writing this report, the full results from the post-mortem examination of the pilot were not available. The toxicological results did not identify any anomalies.

Aircraft information

General

The aircraft, Serial No. 21061846, was manufactured in the United States in 1977 and first registered in Australia in 1990. In 1992, while registered as VH-JXA, the aircraft was ditched in the sea near Hamilton Island, Queensland following engine power loss. Maintenance records indicate the aircraft was returned to service in May 2000, registered as VH-WBZ. The aircraft maintenance records indicated that the total time in service at the time of the accident was about 7,000 hours.

When the aircraft was returned to service in May 2000, it was fitted with wing and tailplane assemblies from a Cessna 210L. That installation was approved by an engineering order that also approved the installation of a larger-capacity Teledyne Continental IO-550-L engine in place of the IO-520-L type originally fitted. The engine was overhauled in 2005 and new cylinders installed in May 2011. Engine time since complete overhaul was 1,300 hours.

The most recent scheduled maintenance was a 100-hourly inspection completed on 28 October 2011 in accordance with the CASA maintenance schedule. A maintenance release was issued in the instrument flight rules and charter operational categories. The only subsequent maintenance recorded was the replacement of the alternator on the day following the 100-hourly inspection.

The current maintenance release was found in the aircraft wreckage with the daily inspection certified on the day of the accident and no defects or overdue maintenance recorded.

Avionics and instrumentation

In May 2011, new avionics were installed in the aircraft including:

- a horizontal situation indicator (HSI)
- a panel-mounted global positioning system (GPS) receiver
- an autopilot
- an engine data monitoring system.

In addition to the pneumatically powered HSI, the aircraft was equipped with a pneumatically powered attitude indicator and an electrically powered turn coordinator. An engine-driven vacuum pump powered the pneumatic system and a 24/28 volt battery/alternator powered the electrical system.

When engaged, the autopilot received data from the turn coordinator (rate of turn) and HSI (heading or navigation) and according to the selected mode, provided outputs to a roll servo and a pitch servo. Electric elevator trim was installed but not integrated with the autopilot system. In case of autopilot malfunction, the system allowed for pilot override through the servo clutch assemblies and/or disconnection via any one of three switches.

An ELT designed to activate automatically in an accident was mounted in the rear fuselage and connected to an external aerial via a coaxial cable. The ELT transmitted emergency signals on 406 MHz for satellite detection and 121.5 MHz for local homing.

As was common for this size aircraft, WBZ was not equipped with a weather detection system such as weather radar.

Limitations and performance

A maximum manoeuvring speed or V_A is specified in the design and certification of aircraft. Significant movements of flight control surfaces at or above V_A substantially increase the risk of damage to an aircraft's structure. V_A for a Cessna 210M was 119 kts indicated airspeed (IAS). That figure was predicated on the aircraft's maximum gross weight of 3,800 lb (1,724 kg) and progressively reduced as weight reduced. At the time of the accident the aircraft's estimated gross weight was 3,150 lb (1,430 kg). According to the Cessna 210M *Pilot's Operating Handbook* (POH), the corresponding V_A was 109 kts. The POH warned: 'Do not make full or abrupt control movements above this speed.'

The POH also specified the maximum structural cruising speed[5] or V_{NO} as 168 kts (IAS) with a warning: 'Do not exceed this speed except in smooth air, and then only with caution.'

According to the aircraft documentation, the performance of the aircraft after installation of the larger IO-550 engine was 'either unchanged or improved'. In the absence of engine-specific data, the POH Cruise Performance chart indicated that the engine power setting that was recorded in the lead-up to the accident would yield a true airspeed (TAS) of 165 kts. Allowing for the reduction of air density with increasing height, a TAS of 165 kts at 6,000 ft corresponds to an IAS of 147 kts.

The aircraft was not certified or equipped for flight in icing conditions.

Meteorological information

On the day of the accident a cold middle level trough produced instability that generated thunderstorms across inland southern Queensland. Imagery recorded from the Warrego weather radar site showed thunderstorm activity in the vicinity of the accident site at the time of the in-flight breakup.

When the pilot logged onto NAIPS at about 1400, he requested the weather forecasts and NOTAMs[6] for Area 41 and Area 44[7]. These were relevant as the flight-planned track originated at Roma in Area 41 close to the eastern boundary, crossed the boundary into the corner of Area 40 then terminated at Dysart in Area 44. It is likely that the actual flight path of the aircraft was contained within Area 41.

The Area 41 forecast current for the time of the flight was issued at 1350. Relevant to the flight-planned track were predictions of isolated thunderstorms with a base of 4,000 ft, heavy to light rain showers and areas of low cloud down to 1,000 ft. Visibility was expected to reduce to 2,000 m, depending on the type of rain encountered. Turbulence and icing was forecast to be severe in thunderstorms and the freezing level between 12,000 and 15,000 ft.

The aerodrome forecast (TAF)[8] for Roma predicted areas of low cloud down to 1,500 ft with periods of rain and visibility reduced to 3,000 m. In addition, there was a 30% probability of thunderstorms with accompanying rain and lower cloud.

A TAF was not routinely issued for Dysart, but TAFs for Emerald (en route) and Clermont (near the destination) could be used for information. Both TAFs, relative to the Roma TAF, forecast higher cloud bases and no rain or thunderstorms.

The pilot of a helicopter (average airspeed of 100 kts) that departed Roma to the north 6 minutes after WBZ advised the ATSB that there was heavy rain in the

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5 This is effectively the maximum safe operating speed of an aircraft.

6 A Notice To Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

7 Australia is subdivided into a number of aviation forecast areas.

8 Aerodrome Forecasts are a statement of meteorological conditions expected for a specific period of time, in the airspace within a radius of 5 NM (9 km) of the aerodrome.

vicinity of Injune. A diversion to the east had been necessary for this pilot to maintain visual flight conditions at low level.

Recorded information

A review of surveillance radar recordings did not identify any returns from the aircraft. The lowest level of radar coverage in the area of the accident site was about 6,000 ft.

The local traffic frequency at Roma Airport was recorded for usage charging. As reported previously in the section titled *Sequence of events*, the recorded radio transmissions from the pilot were routine.

The aircraft's engine data monitoring system recorded a number of engine and environmental parameters. Data downloaded from the unit indicated that engine and electrical system operation was normal until recording ceased abruptly.

The panel-mounted GPS receiver did not record data and the handheld GPS receiver that was found in the wreckage was not in use at the time of the accident (see the following section titled *Wreckage examination*). The two mobile phones that were found in the wreckage were on at the time of the accident and remained on for some time afterwards. Neither phone was configured to record position information, nor did they contain any images relevant to the flight.

Wreckage and impact information

Wreckage examination

Various elements of the aircraft's wings and horizontal tailplane were dispersed over a distance of 350 m to the north of the main wreckage. All of the significant aircraft parts, except the rudder mass balance, were identified and examined.

At the main wreckage site, the fuselage was generally upright in a nose-down, left-roll attitude with the rear fuselage bent around an upright tree. The forward cabin area and nose of the aircraft were severely disrupted from ground and/or tree impact.

Above the forward cabin area and still loosely connected was the remaining wing section, comprising the main spar carry-through with the right wing outboard to the flap/aileron junction and left wing spar attachment fittings. The vertical stabiliser and rudder were still attached.

Figure 1: View to the north of the main wreckage (remnant wing section displaced forward and right from the as-found position)

The engine, still generally located in the engine bay, was essentially intact with no evidence of in-flight failure. Separation of the propeller had occurred through severing of the crankshaft. The propeller was partially buried just in front of the engine with one blade broken out of the hub, and sustained damage that was consistent with low rotational energy.

Reorientation of the matching wing sections showed that the left wing had fractured in three locations and was bent up at an angle of about 30°, about 1 m from the wing root. The right wing spar had several complex bends, including a slight upward bend along the full span and a forward bend to the inboard section consistent with tree/ground impact. The outboard section had fractured in a downward direction.

Reorientation of the matching horizontal tailplane sections showed that the left stabiliser had a slight upward bend and the left elevator was bent up at an angle of about 30°. The right stabiliser had a slight upward bend and the right elevator was bent down about mid span at an angle of about 45°.

All of the structural attachment fittings were examined and found to be secure or showed evidence of overstress failure. Examination of the fractures to structural components did not show any evidence of material deficiency. Shallow corrosion was evident between riveted surfaces including main spar laminates, but did not significantly compromise the strength of the wing.

To the extent possible, flight control continuity was established with no evidence of any flight control system defects. The wing flaps and landing gear were retracted at the time of the ground impact.

The ELT had detached from the fuselage mounting tray. The aerial cable separated from the unit during the accident sequence.

An inspection of the aircraft found no evidence of a lightning strike or hail damage.

The autopilot controller, roll servo, pitch servo, and electric trim servo were recovered from the wreckage and bench tested at a CASA-approved maintenance facility. No pre-impact defects were identified and the servo break-out clutch settings were within manufacturer limits.

A handheld Garmin GPSMAP 96C was recovered from the accident site for technical examination at the ATSB's facilities in Canberra. Two mobile phones were also recovered.

Breakup analysis

A trajectory analysis was carried out to estimate the position of the aircraft at the onset of the in-flight breakup. It used the weight/area of each separated item to calculate the likely effect of wind on trajectory. That result was then applied to the location of the item to establish a likely flightpath.

It was calculated that the aircraft was on a course of 225° and 1/2 km from the main wreckage when the breakup occurred. At the time, the aircraft's height was likely to have been less than 1,000 ft above ground level. The disposition of the separated items did not provide a clear indication of the sequence of the breakup.

Additional information

Thunderstorm hazards

Thunderstorms can present a number of hazards including turbulence, icing, hail, lightning, strong winds, low cloud and heavy rain. Significantly, it is sometimes difficult to visually detect the storms that will produce severe weather.

Severe turbulence as a result of shear between updrafts and downdrafts is common in cloud, and out of cloud, up to 40 km laterally from a severe storm. In severe turbulence, there will be strong vertical gusts such that the airspeed will fluctuate by 25 kts and the g-load[9] vary between 1 and 2.

Icing will affect the performance of an aircraft and hail can physically damage an affected aircraft, but neither is common at temperatures above 0 °C. Lightning varies with the intensity of a storm and a strike to an aircraft can result in the puncturing, burning, melting or distorting of various aircraft parts. Lightning strikes can also damage avionics equipment.

Low cloud and rain can separately or together reduce visibility below that required for visual flight.

Aircraft structural strength considerations

A certified aircraft is required to satisfy structural design standards. A normal category aircraft, such as the Cessna 210M, was designed for maximum in service loads (limit loads) of +3.8 g and -1.52 g with an additional safety factor of 1.5 (ultimate load).

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9 g-load is the nominal value for acceleration. In flight, g-load values represent the combined effects of flight manoeuvring loads and turbulence. This can be a positive or negative value.

The main force acting on an aircraft structure is the aerodynamic lift generated by the wings. For a given wing design, lift is proportional to the angle of the wing relative to airflow (angle of attack) and proportional to the square of wing velocity (effectively airspeed).

In stable atmospheric conditions, any significant loads on the aircraft will be generated during manoeuvring by pilot control input to change the wing's angle of attack. If the airspeed during manoeuvring is above the specified V_A, the forces generated by full control deflection will exceed the limit load and may result in deformation or failure. Alternatively, if the airspeed is below V_A and full control deflection is applied, the limit load will not usually be exceeded.

In addition to manoeuvring loads, in turbulent conditions there are loads generated by updrafts and downdrafts (gusts). Gusts change the direction of the relative airflow and angle of attack and therefore the degree of lift generated by the wing. In severe turbulence the loads on the aircraft will vary abruptly.

For certification purposes, an aircraft must be designed so that it is able to withstand gusts of a certain magnitude at airspeeds up to the specified V_{NO}. However, there was no design requirement to allow for the effect of manoeuvring and gust loads concurrently.

ANALYSIS

The wide distribution of the wreckage and characteristics of the primary fractures were strong evidence of an in-flight breakup. For an aircraft structure to break in flight, there must be either a structural deficiency or the imposition of stress greater than the design limit. In this case, there was no sign of a material defect such as metal fatigue or significant corrosion and no evidence of a design deficiency. The potential factors remaining to be considered, then, were those that could contribute to the generation of excessive stress on the aircraft.

The relevant operational factors are aircraft speed, control inputs and state of the air in which the aircraft is operating. A critical combination of those factors has the potential to generate excessive stress on an aircraft.

While there was no airspeed data available in this occurrence, the recorded engine power data indicates that a cruise power setting was maintained up to the point that the recording ceased. If, as is likely, the recording ceased about the time of the breakup, it is reasonable to deduce that the aircraft was averaging around the nominal cruise airspeed of 147 kts indicated airspeed at the time of the breakup.

At that speed, some 30 kts above the aircraft's weight-specific manoeuvring speed, aircraft control inputs can generate aerodynamic forces sufficient to overstress the aircraft structure. In normal circumstances the pilot would moderate control inputs accordingly. However, in an area of thunderstorm activity, the pilot would probably encounter some level of turbulence with reduced visibility due to low cloud and rain. In that case, the pilot's lack of instrument flying proficiency would increase the risk of spatial disorientation and consequent overcontrolling.

Given the pilot's underlying heart risk factors and dental treatment some 4 1/2 hours before the accident, it is possible that the pilot experienced some degree of impairment. However, there was no indication of any impairment before the flight or from in-flight radio transmissions. Final post-mortem results were not available at the time of publishing this report.

Although the precise circumstances of the accident were not known, it was probable that a combination of aircraft airspeed with turbulence and/or control inputs generated stresses that exceeded the design limits of the aircraft structure.

Post-accident, it was about 16 hours before a search was initiated and a further 8 hours before the wreckage was sighted. A significant factor in the time taken to find the wreckage was the weakness of the transmissions from the accident-damaged emergency locator transmitter. That prevented satellite detection of the wreckage and hampered the homing conducted by search aircraft crews. Contributing to the delayed response was the lack of a SARTIME or Flight Note to alert authorities should the aircraft be overdue or not arrive. In addition, the use by the pilot of a different call sign than associated with the aircraft's registration had the potential to confuse other airspace users and hinder search and rescue efforts.

FINDINGS

From the evidence available, the following findings are made with respect to the in-flight breakup that occurred 100 km north-north-west of Roma, Queensland on 7 December 2011 and involved Cessna Aircraft Company C210M, registered VH-WBZ. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- Although the precise circumstances were not known, a combination of aircraft airspeed with turbulence and/or control inputs generated stresses that exceeded the design limits of the aircraft structure.

Other safety factors

- The efficacy of the search and rescue response was reduced by the weak transmissions from the accident-damaged emergency locator transmitter, and the lack of a SARTIME or Flight Note.

Other key findings

- There was no evidence of any structural material defects.

APPENDIX A: SOURCES AND SUBMISSIONS

Sources of Information

The sources of information during the investigation included the:

- Civil Aviation Safety Authority (CASA)
- Bureau of Meteorology (BOM)
- Australian Maritime Safety Authority (AMSA).

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to CASA, BOM and AMSA. A submission was received from AMSA and, where considered appropriate, the text of the draft report was amended accordingly.

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