Australian Government
Australian Transport Safety Bureau

Flight control system event involving Cessna 210N, VH-JHF

48 km West of Bourke Airport, New South Wales | 12 September 2011

Investigation

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Aviation Occurrence Investigation
AO-2011-115
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Safety summary

What happened

On 12 September 2011 at about 1000, the pilot of a Cessna 210N aircraft, registered VH-JHF, was conducting low-level aerial survey operations near Bourke Aerodrome, New South Wales. After encountering a brief turbulence event, the pilot had difficulty in making elevator control inputs and in maintaining height. The aircraft subsequently landed safely. There were no injuries.

What the ATSB found

The ATSB found that the reported elevator control input difficulties resulted directly from the fracture of the aircraft's two horizontal stabiliser rear attachment brackets. The forward spar of the horizontal stabiliser was also extensively cracked. The fractures and cracking were all consistent with metal fatigue and, as such, were typical of the damage sustained by aircraft as they age and move beyond the manufacturer's originally intended design life. Many manufacturers have addressed the growing potential for this type of damage by introducing *supplemental inspections* to the principal aircraft maintenance requirements.

The Australian Civil Aviation Regulations 1988 (CAR) were being misinterpreted by some class B aircraft registration holders, to the extent that they believed that their aircraft was exempt from the manufacturer's supplemental inspections when their aircraft was maintained using the CASA maintenance schedule. While the CASA maintenance schedule did not make any specific reference to the incorporation of the manufacturer's supplemental inspections, it was a CAR requirement that all aircraft be maintained in accordance with approved maintenance data that, by definition, included those inspections.

What's been done as a result

As a result of this occurrence, on 19 September 2011 the Civil Aviation Safety Authority (CASA) issued Airworthiness Bulletin AWB 55-001 issue 2; highlighting the failure of horizontal stabilisers on Cessna 200 series aircraft. The AWB made recommendations on the maintenance schedule and inspection of the stabiliser in order to ensure the structural integrity of the area.

CASA also published a series of Discussion Papers in December 2012, detailing a range of options for developing updated continuing airworthiness regulations for all aircraft not used in regular public transport operations. This included options for reform of maintenance program requirements for non-RPT aircraft – to bring the regulations up to date with modern technology and current international standards and practice.

The outcomes from the discussion papers were unresolved at the time of writing and therefore the Australian Transport Safety Bureau has recommended that CASA proceed with its program of regulatory reform to ensure that all aircraft involved in general aviation operations are maintained using the most appropriate maintenance schedule for the aircraft type, and to also ensure that the provisions of CAR Schedule 5 are clarified in relation to the incorporation of all relevant supplemental inspections specified for the aircraft type.

Safety message

This occurrence highlights the importance of comprehensive, periodic maintenance inspections and the role of supplemental inspections in maintaining ageing airframes. The ATSB strongly encourages registration holders of class B aircraft to review their aircraft's maintenance schedule to determine if it is the most appropriate for their aircraft and to ensure that it adequately provides for the continuing airworthiness of the aircraft.

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The occurrence

On 12 September 2011 at about 1000 EST[1], the pilot of a Cessna 210N registered VH-JHF (Figure 1) was conducting low-level aerial survey operations near Bourke Aerodrome, New South Wales. While manoeuvring at an altitude of approximately 260 feet, the aircraft pitched down in response to a turbulence event, requiring the pilot to make an immediate corrective pitch-up control input. After this event, the pilot reported that the elevator felt partially jammed and that it was very difficult to make elevator inputs and difficult to maintain altitude.

The pilot flew the aircraft back to the departure point at St George Aerodrome and held overhead until emergency services were in attendance. The aircraft subsequently landed without further incident. There were no injuries.

Examination of the aircraft's horizontal stabiliser showed a complete fracture of one rear attachment bracket and a partial fracture of another. The stabiliser forward spar had also fractured in a number of locations.

Figure 1: VH-JHF

Source: Brendan Scott

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

Context

Aircraft information

The Cessna 210N aircraft, registered VH-JHF, was manufactured in 1980 and first registered in Australia in 1990. The airframe had accumulated 11,299 hours total time in service.

The aircraft had been modified with the approved installation of a magnetometer system for conducting low-level geophysical surveys. Part of the system comprised sensor equipment mounted in a 3.5 metre fibreglass boom attached to the tail of the aircraft.

Maintenance

The horizontal stabiliser attachment bracket assembly was not a life-limited component and so was subject to on-condition maintenance[2]. The aircraft logbook statement nominated the CASA maintenance schedule (Civil Aviation Regulations 1988 (CAR) Schedule 5) as the basis for the periodic (100-hourly or 12-month) maintenance of the airframe. As discussed later in this report, this meant that, consistent with the regulations, the aircraft's owner had elected to maintain the airframe in accordance with the schedule set out in the CAR, rather than using the manufacturer's maintenance schedule or an approved system of maintenance specific to the aircraft. In addition to Schedule 5, the logbook statement specified additional requirements for life-limited component changes, special inspections relating to modifications incorporated in the aircraft, as well as compliance with all Airworthiness Directives.

Instructions for the periodic inspection of the aircraft empennage (Part 2, Section 1 of Schedule 5) were to 'Inspect the wing and empennage to fuselage attachments and surrounding structure'. The schedule specified that the inspection was intended as a thorough check of the affected part to determine whether or not it would continue to be airworthy until the next periodic inspection.

It was reported that the stabiliser attachments were inspected approximately 30 flight hours prior to the occurrence. No defects were reported.

Horizontal stabiliser

Rear attachment bracket assembly

The horizontal stabiliser was secured at the rear by two attachment brackets (part number 1232400, Figure 2). The manufacturer's specifications identified the brackets as being machined from extruded 2024-T3511 aluminium alloy, finished with a conversion coating and paint primer, and having a press-fit bushing installed through the attachment bolt hole. The ATSB's metallurgical assessment of the failed parts found that both conformed to specifications, with the exception that the surface of both was unpainted. The reason for the absence of paint was not determined.

The left bracket (Figure 3) had fractured across both sides of the bolt hole and no longer provided any support for the stabiliser. The fracture surfaces displayed features consistent with intergranular corrosion and fatigue crack progression (Figure 4). General contamination of the forward fracture surface suggested that the section had failed at some time prior to the incident flight. The right bracket had only fractured through the section forward of the bolt hole (Figure 5) and retained some structural integrity. Separation of the fracture surfaces within the ATSB's laboratories found evidence of fatigue crack progression and a similar level of contamination and staining to the fracture on the left.

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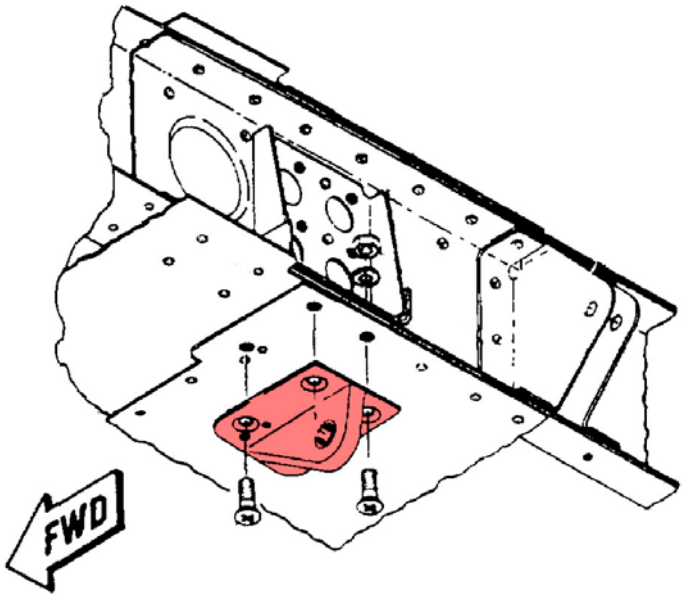
[2] A preventative maintenance regime, where appropriate periodic inspections are used to determine the continued serviceability of a component.

Figure 2: Rear attachment bracket installation

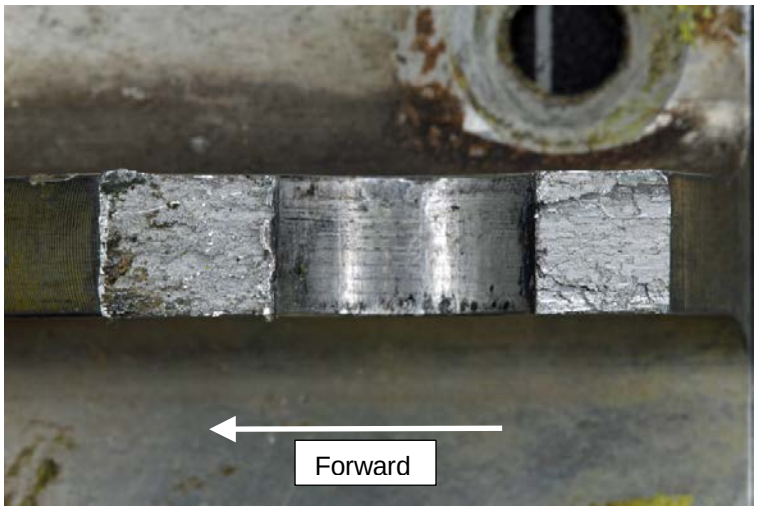


Source: Cessna service manual

Figure 3: Fractured left bracket, separated from attachment bolt

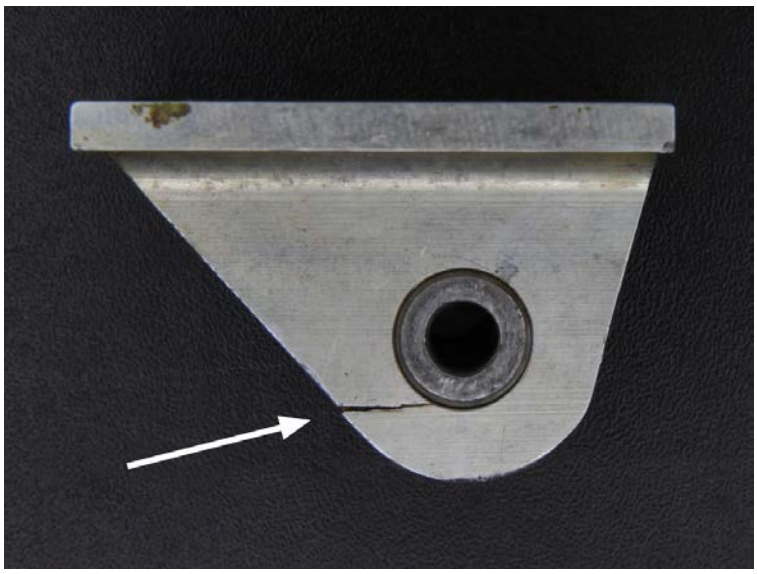
Source: Statewide Aviation

Figure 4: Left attachment bracket



Source: ATSB

Figure 5: Right attachment bracket



Source: ATSB

Forward spar

The horizontal stabiliser forward spar assembly had fractured between the centre and adjacent lightening holes (Figure 6). The forward spar was not examined by the ATSB; however, the appearance and location of the cracking visible in photographs of the spar was consistent with that described in Cessna's mandatory service bulletin SEB02-4 and the associated CASA airworthiness directive AD/CESSNA 210/69.

AD/CESSNA 210/69 amendment 2 was released in September 2004 and related to the inspection of the horizontal stabiliser front spar assembly for cracking between the centre section lightening holes. The inspection was to be carried out prior to the airframe reaching 10,000 hours total time in service and every 110 hours service thereafter. The aircraft maintainer reported that the spar had been inspected per the AD at the required intervals.

Figure 6: Horizontal stabiliser forward spar

Source: Ben Lappin

Other occurrences

As a result of this occurrence, it was reported to the ATSB that a second C210 aircraft had been inspected in the area of the horizontal stabiliser and was also found to have a fractured rear spar attachment bracket.

The ATSB's review of the preceding 15 years' Australian Service Difficulty Reports (SDRs) involving the part number 1232400 bracket assemblies found four instances where one or both of the brackets had cracked and three instances where the brackets were corroded.

Continuing airworthiness

Cessna

Supplemental Inspection Documents and Corrosion Prevention and Control Program

The Cessna 210 aircraft service manual contained *Supplemental Inspection Documents* (SID) and *Corrosion Prevention Control Program* (CPCP) information that was published in Temporary Revision Number 10 on 1 August 2011 (approximately 1 month prior to this occurrence). Section 2A-10-00 of the service manual contained the mandatory inspection time intervals relating to the SIDs and CPCP.

The SIDs contained specific airworthiness inspections that had been developed for numerous Cessna aircraft models. The function of the SIDs was 'to find damage from fatigue, overload or corrosion through the use of the Non-destructive Inspections (NDI) and visual inspections'. The focus of the inspections was on principal structural elements that were described as 'a structure whose failure, if remained undetected, could lead to the loss of the airplane'. Some of the inspections had variable compliance intervals to account for aircraft operation in mild/moderate and severe corrosion environments or typical and severe usage environments. The SIDs were subject to a 2-year compliance period, such that the initial inspections were to be completed by 31 December 2013.

Supplemental Inspection Number 55-10-01 directly related to the removal and detailed inspection of the horizontal stabiliser, elevator and attachments. The inspection was to be carried out initially at 10,000 hours or 20 years, whichever occurred first, and repeated thereafter at intervals of 3,000 hours or 5 years. This inspection had not been carried out on VH-JHF prior to the occurrence. The

manufacturer indicated that this was the first time a comprehensive inspection of the horizontal stabiliser had been published.

The purpose of the CPCP was to control or prevent corrosion in the aircraft's primary structure. Inspection operation 6 in the Cessna 210 service manual specified the tasks that were to be performed every 60 months as part of the CPCP. This included a detailed inspection of the horizontal stabiliser and elevator structure. The initial CPCP inspection was to be carried out in conjunction with the first SID inspection.

Civil Aviation Safety Authority

Airworthiness Bulletins

CASA released Airworthiness Bulletin AWB 55-001 Issue 1 in February 2002 after a series of service difficulty reports relating to horizontal stabiliser spar and attachment cracking on Cessna 210 aircraft over 15 years old, with a total time in service in excess of 9,500 hours. It was recommended that maintenance personnel pay particular attention while inspecting the horizontal stabiliser structural area and that disassembly may be required to ensure the structural integrity could be adequately ascertained.

As a result of the occurrence involving VH-JHF, CASA reissued AWB 55-001 (Issue 2) on 19 September 2011, to again highlight the cracking of horizontal stabiliser components on Cessna 200 series aircraft. In addition to the recommendations of Issue 1 of the AWB, Issue 2 further recommended that 'All Cessna 210 owner operators review their maintenance schedule to ensure that all manufacturer's data is incorporated in either the maintenance schedule or the Log Book Statement'.

CASA also released AWB 02-007 issue 7 - *Cessna's Supplemental Inspection Documents (SIDs) and Corrosion Prevention Control Programs (CPCPs)* in November 2007 after SIDs had been published for other Cessna models. The AWB explained the importance of conducting the inspections and provided the following advice on compliance:

> Briefly, the Regulations ask you to keep your aircraft airworthy. They point you to the manufacturer as the best source of advice on the maintenance needed to do that. For a Cessna, that means the SID and CPCP, if available, unless you can show your alternative addresses the same risks as safely.

Aircraft maintenance schedules and supplemental inspections

It was reported to the ATSB that there was some uncertainty in the general aviation industry about the compliance requirements for supplemental inspections, such as the Cessna SIDs, when the registration holder had elected to use the CASA maintenance schedule for their aircraft's maintenance. The ATSB was also aware that some registration holders considered their aircraft exempt from a manufacturer's supplemental inspections because it was being maintained per the CASA maintenance schedule.

The CARs required the certificate of registration holder of a class B[3] aircraft to ensure that all maintenance is carried out according to that aircraft's maintenance schedule. The maintenance schedule is recorded in the aircraft's logbook statement Part 1 and is, by election, one of the following three options:

- the manufacturer's maintenance schedule (CAR 42A)
- the CASA maintenance schedule (CAR 42B)
- an approved system of maintenance (CAR 42C).

[3] As defined by the Civil Aviation Regulations 1988 and is typically a general aviation aircraft not involved in regular public transport operations.

The manufacturer's maintenance schedules are generally considered to be the most appropriate for the maintenance of most aircraft types. Maintenance information issued by the aircraft and component manufacturers (including special and supplemental inspections) is taken to automatically form part of the manufacturer's maintenance schedule, and as such, forms a mandatory part of the maintenance regime.

An approved system of maintenance is one that has been developed to include all of the matters set out in Regulation 42L of the CARs and must be approved by CASA or an authorised person. In essence, the system of maintenance specifies what to inspect, when to inspect it, and defines the procedures for conducting the inspections. Approval is only given if the approver is satisfied that the system 'adequately provides for the continuing airworthiness of the aircraft'. In consideration of this, the approver must have regard for both the manufacturer's maintenance schedule (if available) and the CASA maintenance schedule.

The CARs allowed the certificate of registration holder of any class B aeroplane to elect to use the CASA maintenance schedule as an alternative to the manufacturer's maintenance schedule or an approved system of maintenance. However, CASA's Civil Aviation Advisory Publication (CAAP) 41-2(0) *Maintenance requirements for class B aircraft* indicated that:

> Manufacturer's schedules are the most appropriate schedules for maintenance of aircraft. However for a number of older aircraft, and for aircraft where the manufacturer's schedules are non-existent or not very comprehensive, the CAA[4] Maintenance Schedule has been developed.

Civil Aviation Order (CAO) 100.5 contained a list of aircraft for which CASA had declared the manufacturer's maintenance schedule inadequate and not to be used to maintain the aircraft. The list did not contain any Cessna aircraft.

The CARs did not specifically mandate or incorporate supplemental inspections when using the CASA maintenance schedule. However, regulation 42V of the CARs stated that:

> A person carrying out maintenance on an Australian aircraft must ensure that the maintenance is carried out in accordance with the applicable provisions of the aircraft's *approved maintenance data*.

Regulation 2A set out what was approved maintenance data, which included (but was not limited to):

> Instructions, issued by the manufacturers of aircraft, aircraft components or aircraft materials, that specify how maintenance on the aircraft, components or materials is to be carried out.

Of relevance also is regulation 42 of the CARs, which specified that if the maintenance schedule for a class B aircraft was found defective or no longer appropriate, the holder of the certificate of registration for the aircraft must, within 7 days after becoming aware of the issue, report the situation to CASA and take corrective action. Specifically, it required that one of the remaining maintenance schedules be elected for future use, or, in the case of an approved system of maintenance, CASA be requested to approve appropriate amendments to the system.

Class B aircraft logbook statements

Investigation of this occurrence prompted the ATSB to review a sample of other class B aircraft maintenance schedules and how they related to supplemental inspections. The review found significant variation within the definition and description of the nominated maintenance schedules, with such variability providing scope for inconsistencies in how supplemental inspections are applied across Australia's fleet of class B aircraft. Examples of logbook statements are shown in Appendix A of this report.

[4] CASA was established from the Civil Aviation Authority (CAA) in July 1995

For those aircraft where the CASA maintenance schedule had been elected, the most comprehensive log book statements had provision for various additions and modifications to the aircraft and had specific clauses relating to continuing airworthiness, including the incorporation of any supplemental inspection programs. In comparison, the most basic log book statements comprised a single line indicating 'CASA maintenance schedule', with no specific mention of supplemental inspections, CPCP or other requirements relating to continuing airworthiness assurance.

Ageing aircraft

As aircraft age, they become more susceptible to structural or component failure through mechanisms such as fatigue, corrosion and wear. The rate at which component degradation occurs depends on many factors, including the number of flight hours and cycles, type of flying, operating and storage environments and aircraft maintenance.

In 2007, the ATSB released research report B20050205 - *How Old is Too Old? The impact of ageing aircraft on aviation safety*. The report examined the relationship between ageing aircraft and flight safety, determined the chronological age of the Australian aircraft fleet and reviewed the current and future directions for the management of ageing aircraft.

The report determined that as of 2005, Australia's fixed-wing, piston-engine aircraft fleet had an average age of 30 years, and, with very few new aircraft being registered, the average age was increasing. This was contrasted against the original intent of many manufacturers, which were producing aircraft with a design life of around 20 years, within which there would be a finite number of flight hours and cycles.

The report made the point that, as aircraft age, the original maintenance schedules may not be sufficient to ensure their (ongoing) safety. While some aircraft manufacturers have recognised this problem and have developed supplementary inspection programs (such as the Cessna SIDs); other aircraft do not have the same level of airworthiness support. The report concluded that adequate maintenance of ageing aircraft requires the participation and ongoing cooperation of aircraft manufacturers, regulatory authorities, owners, operators and maintainers.

Safety analysis

Flight control system event

The elevator control input difficulties experienced by the pilot were the result of a fatigue fracture of the horizontal stabiliser rear attachment brackets. These failures likely allowed some movement of the stabiliser that was sufficient to change the aerodynamic trim and controllability characteristics of the aircraft.

The general stained and discoloured condition of the bracket forward fracture surfaces gave a general indication that the brackets had cracked at some time before the accident flight. As such, it was likely that the cracks/fractures were present during the general visual inspection conducted at the most recent 100-hourly maintenance inspection. Importantly, though, the brackets and therefore the fractures would not have been visible or detectable without some disassembly or removal of the horizontal stabiliser from the airframe, but this was not a specific requirement of the periodic inspection process set out in Schedule 5. Requirements and instructions for the detailed disassembly and inspection of the stabiliser attachments had been published, by way of the Cessna Supplemental Inspection Documents (SIDs), at around the same time as this occurrence. However, these had not yet been introduced into the aircraft's maintenance schedule and provided for a 2-year compliance period, with initial inspections to be completed by 31 December 2013.

It is likely that other factors beyond the age of the aircraft may have contributed to the bracket failures. Specifically, sustained low level operations, such as typically required for geological survey work, have been recognised as a catalyst for fatigue damage and constituted a 'severe usage environment' as defined by Cessna in their SIDs. The ATSB did not have any data to indicate whether or not the magnetometer system installation may have had any similar effect on the fatigue life of the airframe components.

Aircraft maintenance and supplemental inspections

As previously mentioned, the average age of piston-driven aircraft in Australia continues to increase well beyond their original design lives. As this occurs, structural components require increasing inspection vigilance to detect cumulative damage (such as corrosion and fatigue cracking), if continued safe flight is to be assured.

The CASA maintenance schedule was developed as a generic, baseline schedule intended to be used when the manufacturer's own instructions were inadequate or non-existent. It does not contain the detailed maintenance instructions necessary to adequately provide for the continuing airworthiness of ageing aircraft. Despite this, the ATSB understands that a significant proportion of class B aircraft registration holders have elected to use the CASA maintenance schedule for their aircraft (such as VH-JHF) even though the manufacturer has provided and actively maintains a dedicated system of maintenance for that aircraft type. While Additional Requirements in the log book statement may include manufacturers' continuing airworthiness requirements, such practice is inconsistent at best, and as an example, in the case of VH-JHF, inspections on modifications to the aircraft were covered in this way, but not those associated with the continuing airworthiness of the aircraft as a whole.

An aircraft or component manufacturer's supplemental inspections are automatically included as part of an aircraft's maintenance schedule *if* the registration holder has elected to use the *manufacturer's* maintenance schedule. Similarly, if an *approved system of maintenance* was elected, that system must be assessed as adequately providing for the continuing airworthiness of the aircraft. Furthermore, AWB02-007 advises that, without incorporation of the SID and CPCP (if available), an approved system of maintenance is considered 'defective' per CAR 42. While there are no explicit civil aviation regulations relating to the incorporation of supplemental inspections for

aircraft maintained under the CASA maintenance schedule, CAR 42V does require that maintenance is carried out in accordance with the applicable provisions of an aircraft's *approved maintenance data.*

Aircraft maintenance schedules set out *what items to inspect* and *when to inspect them*, but it is the approved maintenance data that provides the procedures and detail required to conduct the necessary inspections. A manufacturer's supplemental inspections fall under the definition of approved maintenance data, as given in regulation 2A of the CARs, and therefore the maintenance instructions contained within the supplemental inspections would apply when the aircraft was being maintained to the CASA maintenance schedule. However, it is clear that such an interpretation is not held universally by operators and maintainers.

Ultimately, the responsibility for having an appropriate and effective aircraft maintenance schedule resides with the certificate of registration holder. Registration holders of class B aircraft are expected to be satisfied that their aircraft's maintenance program is appropriate and adequately provides for the continuing airworthiness of their aircraft.

In summary, supplemental inspections, such as the Cessna SIDs, have been specifically developed by some aircraft manufacturers to complement their existing maintenance schedules, aiding the detection of defects in principal structural elements that might otherwise go unnoticed during the regular periodic inspections. It should therefore follow that the same set of instructions should be applied to aircraft maintained using the baseline CASA maintenance schedule. However, regulations relating to the CASA maintenance schedule and the application of supplemental inspections lack clarity in this regard, and this has allowed for inconsistencies in the application of these important instructions across Australia's fleet of class B aircraft. The ATSB's investigation has found that some certificate of registration holders maintaining their aircraft to the CASA maintenance schedule did not consider that the manufacturer's supplemental inspections were a mandatory part of their aircraft's maintenance program.

The ATSB considers that this represents a safety issue that is likely to become more significant as the average age of aircraft and their corresponding susceptibility to age-related defects continues to increase.

Findings

From the evidence available, the following findings are made with respect to the flight control system event on the Cessna 210 aircraft, registered VH-JHF, and should not be read as apportioning blame or liability to any particular organisation or individual.

Safety issues, or system problems, are highlighted in bold to emphasise their importance. A safety issue is an event or condition that increases safety risk and (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 operating environment at a specific point in time.

Contributing safety factors

- The flight control system event was the result of fracture of the aircraft's horizontal stabiliser rear spar bracket assemblies.
- A general, visual inspection of the empennage, conducted during the last periodic inspection, was ineffective at detecting pre-existing cracks or fractures in the rear spar bracket assemblies.

Other factors that increase risk

- Low-level aerial operations can increase the frequency of airframe loading and reduce the expected fatigue life of affected components.
- Maintaining class B aircraft in accordance with the Civil Aviation Safety Authority (CASA) maintenance schedule, without due regard to the manufacturer's or other approved data, does not adequately provide for the continuing airworthiness of those aircraft.
- **The Civil Aviation Regulations 1988 allow class B aircraft registration holders to maintain their aircraft using the CASA maintenance schedule in situations where a more appropriate manufacturer's maintenance schedule exists. [Safety issue]**
- **The Civil Aviation Regulations 1988 lack clarity regarding the requirement for aircraft manufacturers' supplemental inspections, where available, to be carried out when an aircraft is being maintained in accordance with the CASA maintenance schedule. [Safety issue]**

Safety issues and actions

The safety issues identified during this investigation are listed in the Findings and Safety issues and actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

Depending on the level of risk of the safety issue, the extent of corrective action taken by the relevant organisation, or the desirability of directing a broad safety message to the aviation industry, the ATSB may issue safety recommendations or safety advisory notices as part of the final report.

Regulatory requirements for class B aircraft maintenance

Number:	**AO-2011-115-SI-01**
Issue owner:	Civil Aviation Safety Authority
Who it affects:	All registration holders of class B aircraft

Safety issue description:

The Civil Aviation Regulations 1988 allow class B aircraft registration holders to maintain their aircraft using the CASA maintenance schedule in situations where a more appropriate manufacturer's maintenance schedule exists.

Proactive safety action taken by: Civil Aviation Safety Authority

In reference to the abovementioned safety issue, CASA provided the following comment:

> While the CAR 42V regulatory requirement currently exists for Registered Operators to ensure maintenance is carried out in accordance with the applicable provisions of the aircraft's approved maintenance data, CASA agrees that additional information may assist industry understanding of their regulatory obligations, mainly in conjunction with the use of CAR 42B CASA Maintenance Schedule. To this end CASA published a series of Discussion Papers in December last year (2012) setting out a range of options for developing updated continuing airworthiness regulations for all aircraft not used in RPT operations.
>
> The discussion paper covering maintenance programs set out the items for consideration and options for the reform of the maintenance program requirements for non-RPT aircraft to bring the regulations up to date with modern technology and current international practices. Considerations that were addressed in this discussion paper included dealing with instructions for continuing airworthiness; assessment of ICA is considered a necessary continuing airworthiness management requirement for all aircraft that are adequately supported by a type certificate holder or national aviation authority.

Action number: AO-2011-115-NSA-01

Action status: Monitor

ATSB comment/action in response:

The ATSB acknowledges the actions taken by CASA to date and notes its actions regarding regulatory reform in relation to maintenance programs for general aviation operations. However, given the currently unresolved outcomes from the discussion paper, including the circumstances where the CASA maintenance schedule would continue to be used, the ATSB remains concerned

that this safety issue may not be adequately addressed and has therefore issued the following recommendation:

ATSB safety recommendation to: Civil Aviation Safety Authority

Action number: AO-2011-115-SR-050

Action status: Released

The Australian Transport Safety Bureau recommends that CASA proceed with its program of regulatory reform to ensure that all aircraft involved in general aviation operations are maintained using the most appropriate maintenance schedule for the aircraft type.

Current status of the safety issue:

Issue status: Details of the status of this safety issue are available at www.atsb.gov.au

Regulatory requirements for manufacturers' supplemental inspections

Number:	**AO-2011-115-SI-02**
Issue owner:	Civil Aviation Safety Authority
Who it affects:	All registration holders of class B aircraft

Safety issue description:

The Civil Aviation Regulations 1988 lack clarity regarding the requirement for aircraft manufacturers' supplemental inspections, where available, to be carried out when an aircraft is being maintained in accordance with the CASA maintenance schedule.

Proactive safety action taken by: Civil Aviation Safety Authority

Refer to abovementioned proactive safety action by CASA.

ATSB comment/action in response:

The ATSB acknowledges the actions taken by CASA to date and notes its actions regarding regulatory reform in relation to maintenance programs for general aviation operations. However, given the currently unresolved outcomes from the discussion paper, including the circumstances where the CASA maintenance schedule would continue to be used, the ATSB remains concerned that this safety issue may not be adequately addressed and has therefore issued the following recommendation:

ATSB safety recommendation to: Civil Aviation Safety Authority

Action number: AO-2011-115-SR-049

Action status: Released

The Australian Transport Safety Bureau recommends that CASA proceed with its program of regulatory reform to ensure that the provisions of CAR Schedule 5 are clarified in relation to the incorporation of all relevant supplemental inspections specified for the aircraft type.

Current status of the safety issue:

Issue status: Details of the status of this safety issue are available at www.atsb.gov.au

Other safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Safety action taken by CASA

CASA issued Airworthiness Bulletin AWB 55-001 issue 2 on 19 September 2011 to highlight the failure of horizontal stabilisers on Cessna 200 series aircraft. The AWB made recommendations with respect to the maintenance schedule and inspection of the stabiliser in order to ensure structural integrity of the area.

Action number: AO-2011-115-NSA-02

General details

Occurrence details

Date and time:	12 September 2011 – 2245 EST	
Occurrence category:	Incident	
Primary occurrence type:	Mechanical – Systems – Flight controls	
Type of operation:	Air work	
Location:	48km West of Bourke Aerodrome, NSW	
	Longitude: S 29º 57.07'	Latitude: E 145º 28.13'

Aircraft details

Manufacturer and model:	Cessna 210N	
Registration:	VH-JHF	
Serial number:	21063845	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	Minor	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- Pilot of VH-JHF
- Operator of VH-JHF
- The Civil Aviation Safety Authority
- Cessna Aircraft Company

References

Airworthiness Bulletin AWB02-007: *Cessna's Supplemental Inspection Documents (SIDs) and Corrosion Prevention and Control Programs (CPCPs)*, Issue 7, Civil Aviation Safety Authority, 2007

Aviation Research and Analysis Report B20050205 - *How old is too old? The impact of ageing aircraft on aviation safety,* Australian Transport Safety Bureau, 2007

Cessna Aircraft Company Service Manual: *1977 thru 1984 Model 210 & T210 Series*. 1 March 1996, including Temporary Revisions to 1 October 2011.

Civil Aviation Advisory Publication CAAP 41-2: *Maintenance requirements for class B aircraft,* Civil Aviation Safety Authority, 1992

Civil Aviation Advisory Publication CAAP 42b-1: *CAA maintenance schedule,* Civil Aviation Safety Authority, 1992

Civil Aviation Regulations 1988

Submissions

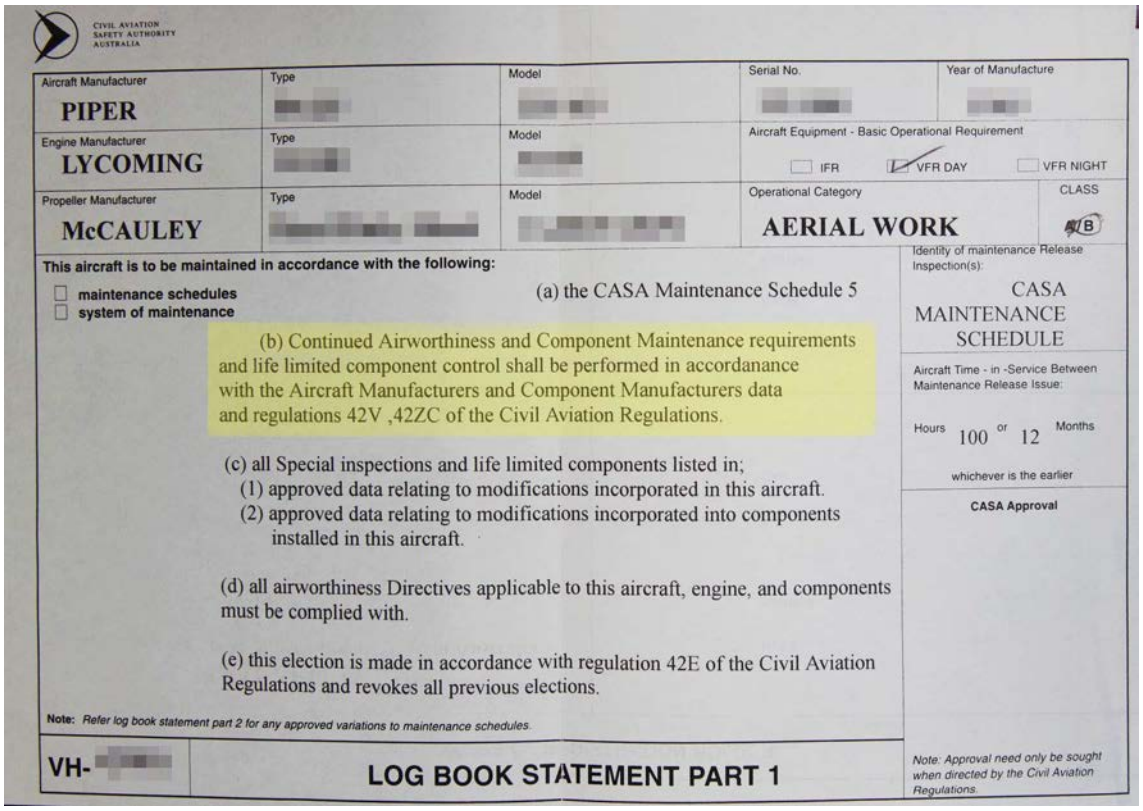
Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003*, the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person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

A draft of this report was provided to the Civil Aviation Safety Authority (CASA), the Cessna Aircraft Company, the National Transportation Safety Board (NTSB), the aircraft maintenance provider, the aircraft operator and the pilot of VH-JHF.

Submissions were received from the Civil Aviation Safety Authority. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

Appendices

Appendix A – Class B aircraft logbook statements



CIVIL AVIATION SAFETY AUTHORITY AUSTRALIA

Aircraft Manufacturer	Type	Model	Serial No.	Year of Manufacture
PIPER				
Engine Manufacturer	**Type**	**Model**	**Aircraft Equipment - Basic Operational Requirement**	
LYCOMING			☐ IFR ☑ VFR DAY ☐ VFR NIGHT	
Propeller Manufacturer	**Type**	**Model**	**Operational Category**	**CLASS**
McCAULEY			AERIAL WORK	A/B

This aircraft is to be maintained in accordance with the following:

☐ maintenance schedules
☐ system of maintenance

(a) the CASA Maintenance Schedule 5

(b) Continued Airworthiness and Component Maintenance requirements and life limited component control shall be performed in accordanance with the Aircraft Manufacturers and Component Manufacturers data and regulations 42V ,42ZC of the Civil Aviation Regulations.

(c) all Special inspections and life limited components listed in;
(1) approved data relating to modifications incorporated in this aircraft.
(2) approved data relating to modifications incorporated into components installed in this aircraft.

(d) all airworthiness Directives applicable to this aircraft, engine, and components must be complied with.

(e) this election is made in accordance with regulation 42E of the Civil Aviation Regulations and revokes all previous elections.

Note: *Refer log book statement part 2 for any approved variations to maintenance schedules.*

Identity of maintenance Release Inspection(s): CASA MAINTENANCE SCHEDULE

Aircraft Time - in -Service Between Maintenance Release Issue:

Hours 100 or 12 Months

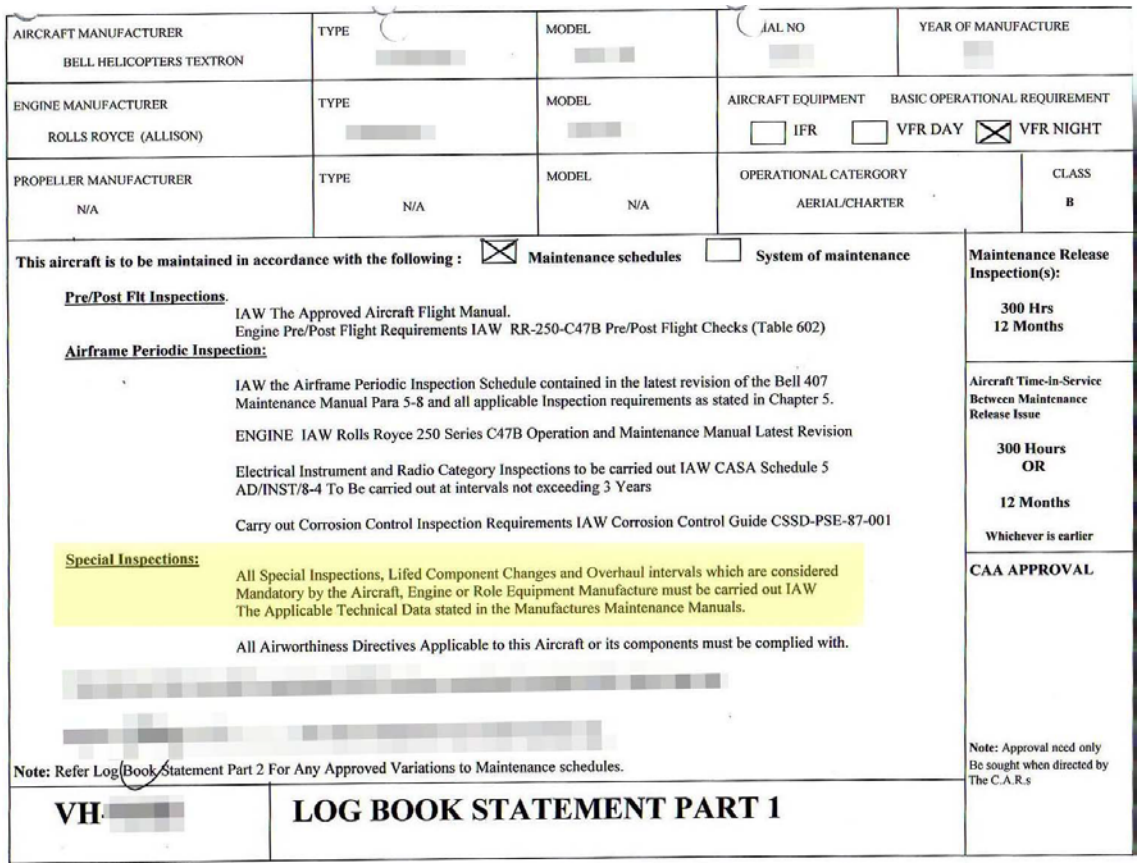
whichever is the earlier

CASA Approval

VH-

LOG BOOK STATEMENT PART 1

Note: Approval need only be sought when directed by the Civil Aviation Regulations.



AIRCRAFT MANUFACTURER	TYPE	MODEL	IAL NO	YEAR OF MANUFACTURE
BELL HELICOPTERS TEXTRON				
ENGINE MANUFACTURER	**TYPE**	**MODEL**	**AIRCRAFT EQUIPMENT**	**BASIC OPERATIONAL REQUIREMENT**
ROLLS ROYCE (ALLISON)			☐ IFR ☐ VFR DAY ☒ VFR NIGHT	
PROPELLER MANUFACTURER	**TYPE**	**MODEL**	**OPERATIONAL CATERGORY**	**CLASS**
N/A	N/A	N/A	AERIAL/CHARTER	B

This aircraft is to be maintained in accordance with the following : ☒ **Maintenance schedules** ☐ **System of maintenance**

Pre/Post Flt Inspections.
IAW The Approved Aircraft Flight Manual.
Engine Pre/Post Flight Requirements IAW RR-250-C47B Pre/Post Flight Checks (Table 602)

Airframe Periodic Inspection:

IAW the Airframe Periodic Inspection Schedule contained in the latest revision of the Bell 407 Maintenance Manual Para 5-8 and all applicable Inspection requirements as stated in Chapter 5.

ENGINE IAW Rolls Royce 250 Series C47B Operation and Maintenance Manual Latest Revision

Electrical Instrument and Radio Category Inspections to be carried out IAW CASA Schedule 5
AD/INST/8-4 To Be carried out at intervals not exceeding 3 Years

Carry out Corrosion Control Inspection Requirements IAW Corrosion Control Guide CSSD-PSE-87-001

Special Inspections:

All Special Inspections, Lifed Component Changes and Overhaul intervals which are considered Mandatory by the Aircraft, Engine or Role Equipment Manufacture must be carried out IAW The Applicable Technical Data stated in the Manufactures Maintenance Manuals.

All Airworthiness Directives Applicable to this Aircraft or its components must be complied with.

Note: Refer Log Book Statement Part 2 For Any Approved Variations to Maintenance schedules.

Maintenance Release Inspection(s):

300 Hrs
12 Months

Aircraft Time-in-Service Between Maintenance Release Issue

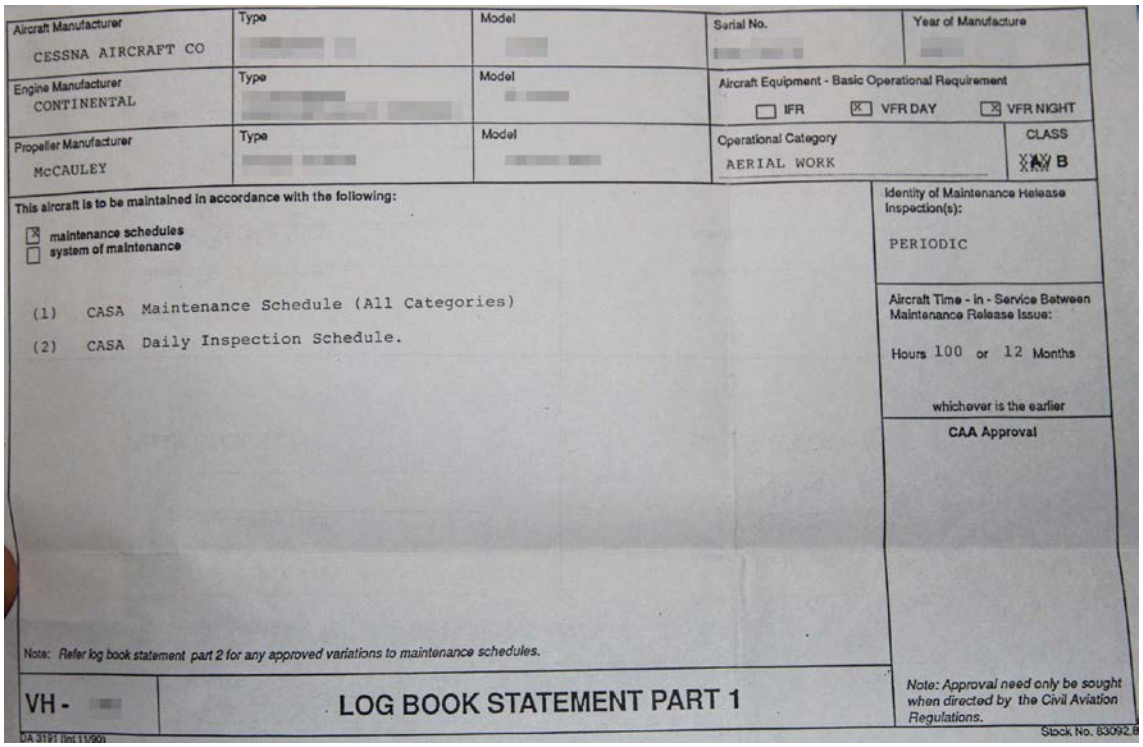
300 Hours
OR
12 Months
Whichever is earlier

CAA APPROVAL

Note: Approval need only Be sought when directed by The C.A.R.s

VH-

LOG BOOK STATEMENT PART 1



Aircraft Manufacturer	Type	Model	Serial No.	Year of Manufacture
CESSNA AIRCRAFT CO				
Engine Manufacturer	**Type**	**Model**	**Aircraft Equipment - Basic Operational Requirement**	
CONTINENTAL			☐ IFR ☒ VFR DAY ☒ VFR NIGHT	
Propeller Manufacturer	**Type**	**Model**	**Operational Category**	**CLASS**
McCAULEY			AERIAL WORK	~~A~~ / B

This aircraft is to be maintained in accordance with the following:

☒ maintenance schedules
☐ system of maintenance

(1) CASA Maintenance Schedule (All Categories)

(2) CASA Daily Inspection Schedule.

Identity of Maintenance Release Inspection(s):

PERIODIC

Aircraft Time - in - Service Between Maintenance Release Issue:

Hours 100 or 12 Months

whichever is the earlier

CAA Approval

Note: *Refer log book statement part 2 for any approved variations to maintenance schedules.*

VH - [redacted]

LOG BOOK STATEMENT PART 1

Note: Approval need only be sought when directed by the Civil Aviation Regulations.

DA 3191 (list 11/90) Stock No. 83092.6

Aircraft Manufacturer	Type	Model	Serial No.	Year of Manufacture
S.O.C.A.T.A.-GROUPE AEROSPATIALE				
Engine Manufacturer	**Type**	**Model**	**Aircraft Equipment - Basic Operational Requirement**	
Lycoming			■ IFR ☐ VFR DAY ☐ VFR NIGHT	
Propeller Manufacturer	**Type**	**Model**	**Operational Category**	**CLASS**
Hartzell			AERIAL WORK	A / (B)

This aircraft is to be maintained in accordance with the following:

☒ maintenance schedules

☐ system of maintenance

- Civil Aviation Safety Authority Schedule 5 All Categories

- All airworthiness directives applicable to this aircraft must be complied with.

Identity of Maintenance Release Inspection(s):

PERIODIC

Aircraft Time - in - Service Between Maintenance Release Issue:

Hours 100 or 12 Months

whichever is the earlier

CAA Approval

Note: Refer log book statement part 2 for any approved variations to maintenance schedules.

VH [redacted]

LOG BOOK STATEMENT PART 1

Note: Approval need only be sought when directed by the Civil Aviation Regul[redacted]

Aircraft Manufacturer	Type	Model	Serial No.	Year of Manufacture
CESSNA.				
Engine Manufacturer	**Type**	**Model**	**Aircraft Equipment - Basic Operational Requirement**	
CONTINENTAL			☐ IFR ☒ VFR DAY ☐ VFR NIGHT	
Propeller Manufacturer	**Type**	**Model**	**Operational Category**	**CLASS**
MC CAULEY.			PRIVATE.	A (B)

This aircraft is to be maintained in accordance with the following:

☐ maintenance schedules
☐ system of maintenance

CESSNA MAINTENANCE SCHEDULE 5.

Note: *Refer log book statement part 2 for any approved variations to maintenance schedules.*

Identity of Maintenance Release Inspection(s):

PERIODIC.

Aircraft Time - in - Service Between Maintenance Release Issue:

Hours N/A or 12 Months

whichever is the earlier

CAA Approval

Note: Approval need only be sought when directed by the Civil Aviation Regulations.

VH - [redacted]

LOG BOOK STATEMENT PART 1

DA 3191 (Int 11/90) Stock No. 83092.6

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 it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

24 Hours 1800 020 616
Web www.atsb.gov.au
Twitter @ATSBinfo
Email atsbinfo@atsb.gov.au

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Flight control system event involving Cessna 210N, VH-JHF 48 km West of Bourke Airport, NSW, 12 September 2011

AO-2011-115
Final – 16 August 2013