Australian Government
Australian Transport Safety Bureau

Publication Date: November 2010 ISBN 978-1-74251-112-2

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ATSB-Nov10/ATSB143

Released in accordance with section 25 of the Transport Safety Investigation Act 2003

ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation AO-2009-070
Final

Collision with terrain, VH-ZRR 21 km SE of Kojonup ALA, Western Australia 17 November 2009

Abstract

At about 0800 Western Standard Time on 17 November 2009, the pilot of a Cessna Aircraft Company A188B Agwagon, registered VH-ZRR was fatally injured when his aircraft impacted terrain during spraying operations near Kojonup, Western Australia. The aircraft sustained serious damage.

The investigation determined that the aircraft stalled at an altitude from which the pilot was unable to recover before the aircraft impacted terrain.

The investigation identified two safety issues in regards to the supervision of agricultural pilots. The first related to confusion within the aerial application industry concerning the required regulatory authorisation for a pilot that is the supervisor of a pilot holding an Agricultural Pilot (Aeroplane) Rating Grade 2 (Ag 2 pilot). In response to this issue, CASA provided an explanation of the relevant legislative material, which has been reproduced in this report, as well as an undertaking to provide education to industry on this matter. The second safety issue concerned the lack of guidance on the supervision of pilots with an Ag 2 rating. In response CASA has agreed to provide Advisory Circular guidance to industry on how to supervise Ag 2 pilots.

FACTUAL INFORMATION

History of the flight

On 16 November 2009, the pilot of a Cessna Aircraft Company A188B Agwagon[1] aircraft, registered VH-ZRR (ZRR) flew from the aircraft's base to a property about 21 km south-east of Kojonup Aircraft Landing Area (ALA), Western Australia. The pilot then completed almost 3.5 hours of spraying operations. During those operations, the pilot commenced, but failed to complete spraying a field immediately adjacent to a homestead on the property (the field). The application was ceased due to the wind conditions blowing the spray towards the homestead. The pilot intended to complete the field at the end of the day's final flight but, as the wind conditions had not improved, he terminated the flight with almost 300 L of spray remaining in the aircraft's hopper.

At 0530 Western Standard Time[2] the following morning, the pilot and loader[3] departed home and arrived at the property at about 0700. The aircraft was refuelled by the loader while the pilot checked and changed some of the aircraft engine's spark plugs. The pilot then completed a pre-flight inspection of the aircraft, started the engine and performed engine power checks for

1 From the C188 family of aircraft, these types of aircraft are specifically designed for agricultural spraying (otherwise known as aerial application) operations.

2 The 24-hour clock is used in this report to describe the local time of day, Western Standard Time (WST), as particular events occurred. Western Standard Time was Coordinated Universal Time (UTC) + 8 hours.

3 Term used to denote ground support personnel whose functions include assisting with mixing chemicals and loading and dispatching the aircraft.

between 10 and 15 minutes before indicating to the loader that the aircraft was okay. The loader reported that the pilot took off at 0758 and tracked towards the field adjacent to the homestead.

Shortly after, witnesses at the homestead observed the aircraft completing the first spray run in an east-to-west direction along the field's northern fence line. The pilot then made a climbing right then left procedure turn[4] before establishing straight and level flight towards the south-east at a low altitude from the field's north-west corner.

As the pilot approached the field's south-eastern boundary, the witnesses observed the aircraft's 'left wing drop', in a manner similar to when the aircraft was turning. Almost immediately thereafter, the nose of the aircraft 'dropped sharply' and the aircraft dived towards the ground. The witnesses stated that the aircraft's engine sounded normal during the straight and level flight, and that the engine noise increased during the dive.

The witnesses did not see the aircraft impact the ground as their view was obstructed by terrain. However, a cloud of dust was observed in the area in which the aircraft disappeared from view, and the witnesses reported hearing the impact with terrain at about 0800.

The pilot sustained fatal injuries and the aircraft was seriously damaged.[5]

Pilot information

Pilot qualifications and licensing

The pilot was appropriately qualified for the flight and held a Commercial Pilot (Aeroplane) Licence and an Agricultural Pilot (Aeroplane) Rating Grade 2 (Ag 2 rating).

The pilot held a valid Class 1 Medical Certificate with no restrictions. There was no evidence of medical, fatigue or physiological issues that would have affected the pilot's performance on the day of the flight. Evidence indicates that the pilot had adequate rest and nourishment before the flight.

Agricultural operations training and experience

The pilot commenced agricultural flying training in May 2007, and was issued with an Ag 2 rating in July 2007. At that time, the pilot had logged about 260 hours of flight time, 42 hours of which were logged as agricultural operations (Ag Ops).[6] Of those hours, 10 were flown in a Cessna A188B fitted with an IO-720 engine, the same aircraft type and engine configuration as ZRR.

From late July to November 2007, the pilot flew about 30 hours in C188 and PA 32[7] aircraft; however, that flying was either transit flying or logged as unsupervised[8] practice Ag hours. In February 2008, the pilot purchased a PA 25[9] and over the next 3 months, logged approximately 10 hours of practice Ag Ops flying.

In May 2008 the pilot obtained employment flying scenic and parachute operations.

The pilot returned to Ag Ops in late September 2008, after successfully completing the required 13 month agricultural aeroplane flight check. The pilot was certified in September 2009 as having completed the 10 hours of Ag Ops under direct supervision that was required after the issue of an Ag 2 rating. He had subsequently flown a further 102 hours of Ag Ops, of which 9 hours were certified as being under direct supervision. At the time of the accident, the pilot had accumulated about 810 total flying hours, of which 133 hours were logged as Ag Ops.

A number of the pilot's supervisors were interviewed, and all reported that the pilot had a tendency to perform 'nasty turns' and that he 'required constant and hard supervision, particularly because of his tendency to rush and pull hard turns'. One stated that the pilot liked to push the aircraft due to preconceived ideas about

4 A manoeuvre used to reverse the direction of flight. See Figure 1 for a diagrammatic representation of the probable turn undertaken by the pilot.

5 The *Transport Safety Regulations 2003* define 'serious damage' as including the 'destruction of the transport vehicle.'

6 A holder of an Ag Rating cannot fly Ag Ops other than through the authority of the holder of an Ag Ops licence, or when authorised by CASA.

7 The Piper Cherokee, an aircraft type that was not designed for Ag Ops.

8 See note 6 above. For a detailed discussion concerning the supervision requirements of an Ag 2 pilot see *Supervision of the pilot* later in this report.

9 The Piper Pawnee, an aircraft specifically designed for Ag Ops.

productivity, and that this led to potentially unsafe flying practices, such as hard banking during repositioning. That supervisor also reported that the pilot had a tendency not to use flap in turns.

Aircraft information

General information

The aircraft was manufactured in the United States (US) in 1975 and exported to South Africa in 1989. In 1996 the aircraft was burnt out, necessitating a major re-build. The aircraft also received a new engine type under a Supplemental Type Certificate (STC).[10]

The aircraft was disassembled and exported to Australia in January 1999, before being reassembled and registered in June 1999 as VH-ZRR. The aircraft was registered under a Special Certificate of Airworthiness as a Restricted Airworthiness Category aircraft,[11] restricting its operation to Ag Ops only.

The aircraft's maximum take-off weight was 1,496 kg (3,300 lb). However, an exemption for operations in excess of that weight was granted under Civil Aviation Safety Authority (CASA) EX22/2002 and CASA EX30/09. Provided the extra weight was carried wholly as jettisonable load, those exemptions permitted a higher take-off weight if that weight was certified, amongst other criteria, through the aircraft's Type Certificate Data Sheet (TCDS).[12]

The TCDS authorised the operation of ZRR at weights up to 4,200 lb (1,905 kg). The relevant Airplane Flight Manual Supplement (AFMS) was attached to the aircraft's Owner's Manual and identified that the aircraft was permitted to operate at this greater take-off weight.

The aircraft was fitted with an aural stall warning device, which was set to sound between 4 and 9 kts above the aerodynamic stall speed in all configurations. The investigation was unable to determine the serviceability of the stall warning device.

The aircraft's details are summarised at Table 1.

Table 1: Aircraft details

Aircraft	
Manufacturer	Cessna Aircraft Co.
Model	A188B
Serial Number	188-02103T
Aircraft total time in service (TTIS)	7,547.9 hours
Engine	
Manufacturer	Lycoming
Model	IO-720-A1B
Serial Number	L-1092-54A
Type	Piston, normally aspirated

The aircraft's last 100-hourly inspection was certified on 1 September 2009 at 7,492.9 hours TTIS. The aircraft's maintenance release was valid until 7,592.9 hours TTIS, or 1 September 2010.

Fuel

The aircraft was refuelled from drums that were transported to and stored at the property's airstrip by the loader. A sample of the drum fuel was taken for later testing by an approved laboratory, which identified that the fuel met the standards required for fuel of that type, and that the 'sample [was] suitable for its intended use'.

The aircraft was reported to have had a full fuel load and about 300 L of spray in the hopper on takeoff from the property's airstrip. Using this information and the weight of the pilot, it is probable that the aircraft's weight was about 1,678 kg (3,700 lb), and that the aircraft was within the published centre of gravity (c.g) limits at that time.

10 A Supplemental Type Certificate authorised the alteration of an aircraft, engine or other item operating under an approved Type Certificate.

11 The Restricted Airworthiness Category Airworthiness Certificate was issued to aircraft that were limited to operations for which the aircraft was specifically designed.

12 A TCDS detailed the official specifications to which each unit (aircraft, engine, propeller, and so on) must conform. The TCDS for the Cessna A118B is listed as TCDS No. A9CE and is available at www.airweb.faa.gov

Operational information

The aircraft's Owner's Manual included advice on restricted category operations,[13] including that:

- the aircraft's speed was restricted to not more than 120 mph (104 kts)
- while the aircraft was capable of operating at speeds from 85 mph (74 kts) to 120 mph, a speed of between 95 mph (83 kts) to 115 mph (100 kts) should be used for very heavy loads due to reduced safety margins
- the aircraft should not be manoeuvred with load factors in excess of 2.5g[14] while carrying heavy loads.

The Owner's Manual also included a stall speed table for weights of 3,800 lb (1,724 kg), 4,000 lb (1,814 kg) and 4,200 lb at 0°, 30° and 60° angle of bank (AOB). The manual stated that the aircraft '…stall characteristics are conventional, and … all controls remains [sic] effective throughout the stall'. The AFMS stated that '…the performance of this airplane equipped with the [updated engine and propeller] is equal to or better than the performance as listed in the original Flight Manual.'

The aircraft operator stated that the normal procedure was to fly spray runs at 120 kts, and to bring the speed back to 80 kts with the use of flap when manoeuvring, (such as in the procedural turns). The operator also stated that the aircraft's stall was characterised by a large nose drop, in the order of 10° to 20° nose down.

Meteorological information

The forecast for the Kojonup area that was valid for the period 0725 to 1800 on 17 November 2009 was for isolated showers and rain, broken[15] stratocumulus cloud with a base of about 3,500 ft above mean sea level (AMSL), wind at 3,000 ft from the west at 20 kts, and visibility reducing to 4,000 m in showers and rain.

The automated weather station at Katanning, which was about 40 km away, reported that at 0800, the wind was from 280° at 9 kts, the temperature was 17 °C and that there had been no rainfall over the previous 3 hours. At 0900, the wind was from 300° at 13 kts, the temperature was 19 °C, and there had been no rainfall over the previous 3 hours.

The loader stated that the weather conditions that morning were fine, and estimated that the wind was from the west at between 5 and 10 kph (3 and 5 kts).

The position of the sun was determined via the Geoscience Australia website at www.ga.gov.au. At 0800 at Kojonup, the sun was at an azimuth[16] of about 90° and an elevation[17] of about 36°.

Recorded information

The aircraft was fitted with an electronic system to assist in and record the conduct of any spraying operations (the Satloc system). Satloc recorded the local time, aircraft position, altitude, heading and speed every 2 seconds. That information was temporarily stored in an internal buffer, before being written at set intervals to the unit's non-volatile memory. The Satloc unit was retrieved from the accident site for technical examination.

The information that was recorded to the Satloc's non-volatile memory was recovered and showed that the aircraft departed from the property's airstrip at 0757:30. The recorded information ceased at 0758:30, while the pilot was positioning the aircraft for the first spraying run. The subsequent data was probably stored in the Satloc's internal buffer and, due to it being a temporary storage, was lost due to the accident.

The Satloc also contained a full recording of the pilot's previous day's spraying operations. That data was examined for any significant characteristics in the pilot's handling of the aircraft. An average angle of bank during the previous day's operation was able to be estimated which, when combined with an estimated weight, enabled the calculation of the stall speed for each recorded data block. The data utilised a number of assumptions in its derivation; however, it

13 The restricted category flight envelope encompassed operating weights from 3,300 lb up to 4,200 lb.

14 1g equates to the Earth's normal gravitational force.

15 Cloud amounts are reported in oktas. An okta is a unit of sky area equal to one-eighth of total sky visible to the celestial horizon. Few = 1 to 2 oktas, scattered = 3 to 4 oktas, broken = 5 to 7 oktas and overcast = 8 oktas.

16 The clockwise horizontal angle from the sun to true north, measured in degrees.

17 The vertical angle to the sun from an ideal horizon, measured in degrees.

showed that the pilot would often bank the aircraft above 45° AOB while positioning for spraying runs, and generally flew at speeds at or below 90kts while positioning the aircraft. The data also showed that, when operating in the restricted envelope, the pilot would often operate the aircraft outside the 83 to 100 kts recommended speed band at heavy weights, as well as exceed the limiting speed of 104 kts.

Wreckage information

The aircraft impacted the ground with a high rate of descent in a wings-level and slightly nose-down attitude, with low forward speed. The aircraft then bounced and impacted the ground in a nose-down attitude. The engine was on an angle of 27°, with the propeller imbedded into the ground at a greater angle. The damage to the aircraft indicated that the majority of forces acting on the aircraft when it first impacted the ground were downward.

The direction of flight on impact was about 130°. As a result of the impact, both wing-mounted fuel cells burst and the hopper shattered. Emergency responders to the accident noted that there was fuel and spray present on the ground near the aircraft.

There was no evidence of any structural failure prior to the aircraft impacting the ground. All major components and structures were accounted for at the accident site. There were indications that the aircraft's engine and propeller were developing power at the time of the ground impact. Aircraft flight control cable continuity was established for all flight controls.

Medical and pathological information

The pilot's post-mortem report found no medical issue that may have contributed to the accident. Toxicological testing identified a slightly raised carbon monoxide level of 5% saturation.

Additional information

Supervision of the pilot

Following the initial issue of an Ag 2 rating, Civil Aviation Order (CAO) 40.6 required a pilot to fly the first 10 hours of Ag Ops under the direct supervision of an Approved Agricultural (Aeroplane) Pilot (approved pilot). On completion of those 10 hours, the pilot was required to be under the indirect supervision of an approved pilot for the next 100 hours of Ag Ops, of which 10 hours were required to be under direct supervision. The definitions of those types of supervision provided in the CAO are very broad.

The investigation revealed some confusion in the aerial application industry as to the required qualification, and the authorisation process to be an approved pilot. Some operators believed that authorisation as an approved pilot arose through operation of Civil Aviation Safety Regulations (CASR) Part 137 and in particular, the function of the Chief Pilot.[18] Other operators believed that specific application to, and authorisation from CASA for approved pilot status was required in all cases.

The required qualifications of an approved pilot were listed in paragraph one to CAO 40.6. The pilot's final supervisor met the required qualifications.

A number of trainers of ab initio Ag pilots refer to the training as being a 150 hour course; the first 40 hours under direct tutelage, and the final 110 hours being under the supervision of an approved pilot. The training course that was defined in CAO 40.6 included detailed guidance for the instructor on the knowledge requirements and flying training sequences in which the student must show proficiency. However, there was no guidance material on the supervision of a newly-qualified Ag 2 rated pilot.

The CAO definitions of the two levels of supervision did not provide guidance for the appropriate conduct of that supervision. Further, opinion on what constituted appropriate supervision varied significantly within the industry.[19] The AAAA advised that it is developing, and is in discussion with CASA concerning, a number of training courses and documentation that will address the supervision of Ag 2 pilots.

Restricted category certification

The operation of the aircraft as a Restricted

18 The Aerial Agricultural Association of Australia (AAAA) website page titled Training & Licensing of Pilots stated that during the initial introduction to the industry, the Ag 2 pilot 'operates under the supervision of a CASA-approved Chief Pilot'. See www.aerialag.com.au

19 CASA did publish 'The Chief Pilot Guide', which included the supervisory responsibilities of that position. However, the guide is written from a chief pilot's safety and commercial responsibility perspective.

Category aircraft allowed for its operation at weights in excess of the certified maximum weight, without structural modification to the aircraft or recertification at the higher weights. This was achieved through trading the aircraft's manoeuvring load factor[20] at the certified maximum weight for a greater weight, but with a reduced manoeuvring load factor.[21] In effect, the higher maximum operating weight was the result of trading the capability to manoeuvre the aircraft at 3.8 g at the certified maximum weight for gentler manoeuvring at 2.5 g. To ensure that the lower manoeuvring load factor was not exceeded, the manufacturer lowered the maximum speed that the aircraft should be flown when operating above the certified normal maximum operating weight to 104 kts. The aircraft was then certified to operate in what was labelled the Restricted Category, being a defined performance envelope at specific weights above the normal maximum operating weight.

Aircraft stall information

The aerodynamic stall speed that is usually quoted for an aircraft is based on; power off, maximum weight, straight and level unaccelerated flight with the speed slowly decreasing. The stall speed quoted in the Owner's Manual for ZRR was 61 mph (53 kts).

An aircraft's stall speed varies with its weight, c.g, loading, type of manoeuvre (such as a tight turn or quick pull up), and whether power has been applied. Tight turns and rapid pull ups increase the stall speed. A 2g pull up, or a 60° banked turn without altitude change, will increase the stall speed by 40 %. Increasing an aircraft's weight by 25 % above the aircraft's maximum load will increase the stall speed by 12 %. With full power, an aircraft's stall speed will generally be about 10 % lower than that with power off.

Based on the quoted stall speed for the aircraft of 53 kts, Table 2 lists the stall speed for various weights and g loadings.

Table 2: Cessna A188B stall speeds

	1g	2g	2.5g
1,496 kg	53 kts	75 kts	84 kts
1,678 kg	56 kts	79 kts	89 kts
1,905 kg	60 kts	85 kts	95 kts

ANALYSIS

The meteorological conditions and position of the sun suggested that it was unlikely that either contributed to the accident.

The likely exceedances of the aircraft's limiting speed when operating at weights in the restricted category flight envelop probably did not affect the structural integrity of the aircraft. An examination of the aircraft wreckage and of the aircraft's maintenance documentation revealed that it was unlikely that the accident was the result of a mechanical fault or failure.

Aircraft handling

A representation of the aircraft's probable final flight path is at Figure 1. Reversal turns using 60° angle of bank (AOB) (annotated in red) and 45° AOB (annotated in green) at 85 kts are depicted before a period of straight and level flight directly to the accident site. The estimated heading during the period of straight and level flight derived from these projections approximates a final flight direction of about 130°, and is consistent with the direction of the ground impact and wreckage trail. The position of the wreckage indicates that the turn may have been initiated to position the aircraft on a cleanup run along the eastern boundary of the field.

Figure 1: Probable flight path based on witness description

The left turn observed by the witnesses immediately before the accident, the reported

20 Stress applied to the aircraft structure as multiple of that in 1g flight.

21 The aircraft Owner's Manual identified the maximum flight load factor at the normal maximum weight as 3.8 g. When operating at gross weights above the normal maximum weight, the maximum load factor was reduced to 2.5 g.

preference of the pilot to 'rush and pull hard turns', and the Satloc evidence of the use by the pilot of high AOB turns to position the aircraft; support and are consistent with the pilot entering a steep, level, left turn after transiting from the north-west corner to the south-east corner of the field. The Satloc data also indicated that this turn was likely to have been conducted at a speed at or below 90 kts.

The high vertical velocity and low forward speed on impact with terrain, as well as the witness's report that the nose of the aircraft suddenly dropped and the aircraft dove towards the ground almost immediately after commencing the turn, is consistent with an aerodynamic stall. Any mishandled 60° angle of bank turn at the probable aircraft weight of 1,678 kg at speeds below 90 kts would increase the risk of the aircraft stalling. The application of rapidly increasing g in such a turn would deepen the stall before any reaction by the pilot. The low-level nature of aerial application minimises the height available for any recovery.

The witness reports that the engine noise increased when the aircraft dove towards the ground, as well as the wings-level attitude at impact, are probably evidence of an attempt by the pilot to recover from the stall.

There is insufficient evidence available to rule out all possible scenarios that may have led to the low-level aerodynamic stall. However, it is clear that the aircraft stalled at a height from which the pilot was unable to recover before impacting terrain.

'Approved pilot' qualification

The potential confusion in the aerial application industry concerning the required authorisation to supervise Agriculture Pilot (Aeroplane) Rating Grade 2 (Ag 2) pilots may be the result of Civil Aviation Safety Regulation Part 137 being regarded by some in the industry as the one-stop-shop for all regulations applicable to aerial application operations. Confusion as to the correct authorisation for the supervision of Ag 2 pilots increased the risk of an inappropriately qualified person supervising an Ag 2 pilot.

Guidance for the supervision of Ag 2 rated pilots

The relevant Civil Aviation Order is very detailed in the knowledge base and flying skills required for the issue of an Ag 2 rating. Guidance on how the supervisor should approach reinforcing and monitoring those skills and knowledge bases does not exist, outside of that under development by the Aerial Agricultural Association of Australia. The lack of guidance material for the supervision of an Ag 2 pilot increases the risk of the inadequate supervision of such pilots.

There was considerable variance of opinion within the aerial application industry as to how the supervision of Ag 2 pilots should be undertaken. The 'Chief Pilot Guide' does not appear to be an appropriate substitute due to the commercial considerations that apply to the position of chief pilot.

FINDINGS

Context

From the evidence available, the following findings are made with respect to the collision with terrain that occurred 21 km south-east of Kojonup Aircraft Landing Area, Western Australia on 17 November 2009 and involved Cessna A188B aircraft, registered VH-ZRR and should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The aircraft stalled at a height from which the pilot was unable to recover before impacting terrain.

Other safety factors

- Confusion within the aerial application industry concerning the correct authorisation for the supervision of an Agriculture Pilot (Aeroplane) Rating Grade 2 pilot increased the risk of an inappropriately qualified person supervising such a pilot. *[Minor safety issue]*
- The lack of guidance material for the supervision of an Agriculture Pilot (Aeroplane) Rating Grade 2 pilot increased the risk of the inadequate supervision of such a pilot. *[Significant safety issue]*

SAFETY ACTION

The safety issues identified during this investigation are listed in the Findings and Safety 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.

All of the responsible organisations for the safety issues identified during this investigation were given a draft report and invited to provide submissions. As part of that process, each organisation was asked to communicate what safety actions, if any, they had carried out or were planning to carry out in relation to each safety issue relevant to their organisation.

Civil Aviation Safety Authority

Authorization of approved pilots

Minor safety issue

Confusion within the aerial application industry concerning the correct authorisation for the supervision of an Agriculture Pilot (Aeroplane) Rating Grade 2 pilot increased the risk of an inappropriately qualified person supervising such a pilot.

Action taken by the ATSB

During the investigation, the ATSB discussed the background for this safety issue and the associated safety risk with the Civil Aviation Safety Authority (CASA). The potential for a reduction in the associated risk to as low as reasonably practicable by proactive CASA safety action was highlighted.

Response from CASA

In its response to this safety issue, CASA advised that:

> CASA agrees there is evidence of confusion regarding the qualifications required to supervise an Ag2 rated pilot. Civil Aviation Safety Regulation (CASR) 137 and Civil Aviation Order (CAO) 40.6 are not directly related or interactive legislative components and must therefore be dealt with and considered separately. The following explains:
>
> CASR 137 - is applicable to a person applying for or who holds an Air Operator Certificate (AOC) authorising "aerial application operations - other than rotorcraft". This means aeroplanes only. In other words, it is the how to do business and flying operations regulations for aeroplane aerial application operators. There is no relevant CAO for aeroplane aerial application AOC holders as CASR 137 has already superseded CAO 20.21 is this regard for aeroplanes.
>
> CAO 20.21 - is applicable to "aircraft engaged in agricultural operations" not aircraft engaged in "aerial application operations" (refer CASR 137). However, CAO 20.21 is still applicable to helicopters as CASR 137 does not refer to helicopter aerial application operations as yet. In other words, it is the how to do business and flying operations directions for helicopter agricultural operators and therefore CAO 20.21 cannot be repealed until CASR 137 includes rotorcraft.
>
> CAO 40.6 - is a set of directions issued under sub regulation 5.14(1), regulations 5.16 and 5.18 of Civil Aviation Regulations (CAR) 1988 for the purposes of describing the flight tests that must be passed, other requirements that must be satisfied, the authority given by and the limitations of that authority for people who wish to train persons for the issue of and obtain an agricultural rating in either aeroplanes or helicopters. In other words, it is a set of ground and flying training, flight testing and limiting directions empowered by CAR 1988 Part 5. Therefore, it is the how to do business and flying operations regulations for ALL providers of "agricultural flying training" and not directly linked to CASR 137, other than 137 requiring an operator to ensure their pilots are correctly qualified.
>
> The supervision requirements in CAO 40.6 are risk mitigators for new AG rating holding pilots, added for the same reasons new flying instructor rating holding pilots require supervision as outlined in CAO 40.1.7 (instructor ratings aeroplanes) and CAO 40.3.7 (instructor ratings helicopters).
>
> CASA intends to promulgate information and provide education to industry to clarify the requirements in CASR Part 137 and CAO 40.6.

ATSB assessment of response/action

The ATSB is satisfied that the proposed action by CASA will, when complete, adequately address the safety issue.

Guidance on the supervision of Ag 2 pilots

Significant safety issue

The lack of guidance material for the supervision of an Agriculture Pilot (Aeroplane) Rating Grade 2 pilot increased the risk of the inadequate supervision of such a pilot.

Action taken by the ATSB

During the investigation, the ATSB discussed the background for this safety issue and the associated safety risk with CASA. The potential for a reduction in the associated risk to as low as reasonably practicable by proactive CASA safety action was highlighted.

Response from CASA

In its response to this safety issue, CASA advised that:

> CASA will development [sic] an Advisory Circular that provides guidance to industry as to how supervision of Ag 2 pilots may be conducted. CASA will also address the issue of differences in the aeroplane along with the helicopter flight training syllabi.

ATSB assessment of response/action

The ATSB is satisfied that the proposed action to be taken by CASA adequately addresses the safety issue.

SOURCES AND SUBMISSIONS

Sources of Information

The sources of information during the investigation included the:

- pilot's past supervisors and trainers
- aircraft operator
- Aerial Agricultural Association of Australia
- Civil Aviation Safety Authority (CASA)
- Bureau of Meteorology
- Geoscience Australia
- United States Federal Aviation Administration.

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 the owner/operator of the aircraft, a number of witnesses, the aircraft manufacturer and CASA.

Submissions were received from CASA and a witness. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly