Aviation Safety Investigation Report 199602321

Aerospatiale
Squirrel
Cessna Aircraft Company
182E

22 July 1996

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Aviation Safety Investigation Report

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Occurrence Number: 199602321 **Occurrence Type:** Incident
Location: Cairns, Aerodrome
State: QLD **Inv Category:** 3
Date: Monday 22 July 1996
Time: 1735 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: Aerospatiale
Aircraft Model: AS.350B
Aircraft Registration: VH-XMR **Serial Number:** 2292
Type of Operation:
Damage to Aircraft: Nil
Departure Point: Cairns QLD
Departure Time:
Destination: Cairns QLD

Aircraft Manufacturer: Cessna Aircraft Company
Aircraft Model: 182E
Aircraft Registration: VH-DUW **Serial Number:** 18253795
Type of Operation: Miscellaneous Parachute Jump
Damage to Aircraft: Nil
Departure Point: Cairns QLD
Departure Time:
Destination: Cairns QLD

Approved for Release: Wednesday, July 30, 1997

FACTUAL INFORMATION

Sequence of events

An Aerospatiale AS350B (AS50) helicopter had been hired by the Civil Aviation Safety Authority (CASA) to perform a flight test of a recently installed precision approach path indicators (PAPI) system. The airport owners, the Cairns Port Authority, had asked CASA to conduct the tests as part of the acceptance procedure prior to the commissioning of the pilot-interpreted approach aid. The PAPI site was located clear of the sealed runway surface but within the runway strip.

A CASA pilot had submitted the flight plan to air traffic control (ATC) via a phone call direct to the Cairns ATC Centre using a number that was provided for the notification of local flights. This procedure did not require flight planning via the regional briefing office in Brisbane.

The helicopter had been hired on the morning of the occurrence and there was insufficient time for the CASA pilot to be rated for solo flight in accordance with company procedures. Therefore the helicopter was operated by a company pilot as pilot in command with the CASA pilot as co-pilot. The CASA pilot briefed the company pilot as to the requirements as each test run transpired.

Runway 15 was the duty runway and the crew of the helicopter commenced operations by testing the runway 15 PAPI system, conducting several runs to the runway centreline. On each occasion the helicopter landed on the runway, even though some parts of the approach were conducted off the centreline. After landing, the crew air-taxied the helicopter to a position near the PAPI site and conducted briefings with the ground party to ascertain their requirements for future runs. These manoeuvres sometimes resulted in the helicopter being held clear of the runway strip, but on occasions it remained within the strip boundaries. Other runway movements took place during this time, including periods when the AS50 was within the runway strip.

After completing the runway 15 tests, the crew were asked to hold away from the aerodrome while a B727 departed. They were then cleared by ATC to land on runway 33 to initialise the global positioning system (GPS) equipment with the ground party prior to commencing the runway-33 PAPI flight tests. The brief to ATC had indicated that the crew would require an approach to the centreline and then position the helicopter abeam the PAPI site, but remaining on the centreline, for initialisation. The crew entered a hover in this position, approximately 2 ft above the runway.

A Cessna 182 (C182) had just completed a parachute drop and the pilot had been instructed to make a visual approach to runway 15. He had continued this approach until over the runway threshold when, as no landing clearance had been issued by ATC, he reported short final. The aerodrome controller (ADC) then gave a landing clearance. The pilot then requested permission to "land long" to facilitate taxi to his company apron. This request was approved by the ADC. The crew of the helicopter heard these transmissions but elected not to question the ADC as they were unsure of the runway being used by the C182.

As the pilot of the C182 was about 20 ft above the runway surface and about to flare, he noticed the helicopter approximately 100 - 150 ft in front of him and commenced a go-around. The C182 passed immediately above the AS35 and came within 15 ft of that helicopter.

Both aircraft subsequently completed their operations without further incident.

Flight test requirements

The Cairns Port Authority had conducted several meetings with CASA's Cairns District Office in the months preceding the test flight regarding the requirements for a flight test of the PAPI systems. On 21 June 1996, the Cairns Port Authority had written to the Cairns District Office requesting the flight test be conducted on Monday 22 July 1996 and specified the personnel and equipment that they would provide. This date was agreed by the Cairns District Office.

At 1000 EST on the morning of the flight, the Cairns Port Authority contacted the Cairns District Office to inquire about the final arrangements. None had been made. A Canberra based CASA pilot was in Cairns on unrelated CASA business and, at approximately 1130, was asked to conduct the test flight. Shortly after, arrangements were made for the CASA pilot and a member of the CASA ground party to provide a general briefing prior to a scheduled departure of 1500. No ATC representatives were asked to attend this briefing.

Flight planning

The team briefing was given at about 1500, after which the CASA pilot phoned Cairns ATC and submitted a verbal flight plan for a local flight. This included information of a generally non-precise nature such as the requirement to make several runs from 2,000 ft and approximately 4 NM, and the need to initialise the GPS while hovering on the runway next to the PAPI sites. The pilot stated that he informed ATC of the need to make each approach to the runway centreline and of the possible requirement to use the runway strip after landing. Although all parties agreed that such a conversation did take place, the investigation was unable to obtain evidence of the exact details contained in the flight plan notification.

A CASA ground party member had, in the month preceding the flight test, obtained a sample flight plan from the Melbourne-based flying unit. This plan detailed the procedures and requirements to conduct such a flight test.

No written flight plan was submitted.

Air traffic control

There were five controllers in the tower at the time of the occurrence. A rated ADC had controlled the initial runway-15 PAPI checks and had instructed the crew of the helicopter to track towards runway 33 and then handed over to a rated ADC who was undergoing familiarisation following a period of leave. The current ADC remained at the console supervising the familiarising ADC and, although feeling a little tired, considered himself fit to undertake the task.

The familiarising ADC issued a clearance for a B727 to depart and then cleared the helicopter to land. In doing so, he wanted to refer to the PAPI site in his transmissions but became confused as to the name of the PAPI during his instructions to the helicopter crew. Consequently the supervising ADC moved away from the console and picked up the instructional material on the equipment for the familiarising ADC to read. The helicopter then landed on the centreline, next to the runway 33 PAPI site, and commenced initialisation. Both ADCs were then of the opinion that the helicopter had manoeuvred to a position outside the runway strip markers, even though the clearance to land authorised the crew to use the runway and runway strip. No transmission clarifying this situation was made.

As the familiarising ADC was reading the PAPI documentation, the pilot of the C182 reported short final. The ADC looked up, saw the C182 over the threshold, made a quick scan of the runway and, believing the helicopter to be clear of the runway strip, issued a landing clearance. He then approved the long-landing request because there were no other aircraft needing to use the runway.

The pilot of the C182 then reported that he was going around due to a helicopter on the runway.

Neither ADC saw the C182 until the pilot reported short final because its approach had been across the setting sun, which severely restricted their observations in that sector. They had used the radar to monitor its position relative to the aerodrome. All the controllers thought that the helicopter had operated outside the runway strip markers during its work on the runway-15 PAPI site, even though the initial approach was on the centreline.

Although the two ADCs believed that the helicopter was hovering outside the markers, some of the other controllers believed that the helicopter was within the runway strip. They were each attending to their own tasks at the time and did not look specifically at the runway until after the clearance for the C182 to land long was given. Although two of the controllers saw what they considered to be a conflict, they had insufficient time to speak before the pilot of the C182 had commenced his go-around.

The flight progress strip for the helicopter was in the sequence bay at the ADC console, a position that indicated authorisation for the use of the runway.

Meteorological information and tower location

The incident occurred at approximately 1730, when the sun was low on the horizon and the sun shields in the tower were deployed to minimise the effect of the brightness. This situation made it difficult to see the C182 as it made its turn onto final and the controllers did not see the aircraft at all until short final.

There were many areas of shade and sun covering various parts of the runway but the position of the helicopter was such that it was in one of the better situations for sighting purposes. However, the comparatively low aspect of the control tower cabin, when combined with the hover height of 2 ft, enabled the ADCs to see grass from the far side of the runway strip under the helicopter skids. The controllers stated that this caused a visual perception of the helicopter being beyond the grass and therefore clear of the runway strip.

Helicopter crew

The helicopter was equipped with a communications system that allowed only the pilot in command to use the radio and consequently, all communications with ATC were performed by the company pilot. However, the flight-test requirements were being specified by the CASA pilot who was the flying pilot for the majority of the tasks. This system therefore required a relaying of requests through both pilots with a resultant increase in workload.

Even though a flight plan had been notified, each test run was slightly different and the company pilot was unaware of the changes until briefed by the CASA pilot immediately before the run commenced. These briefings included requests from the ground party prior to each run.

During the runway-15 PAPI tests, the crew had made their approaches to the runway centreline and had remained on the runway for most of the time between runs. They had received a landing clearance in each case and that entitled them to remain on the runway until commencing the departure phase of each run. They usually hovered over the grass area when co-ordinating with the ground party. During these manoeuvres, the helicopter hovered both inside and outside the runway strip markers while runway operations continued.

Pilot of the C182

The pilot had received a clearance to make a visual approach and considered it normal to call short final over the threshold and with the speed of the aircraft approximately 130 kts. It was also normal to ask for a long landing in order to minimise taxiing distances to the company dispersal area.

After receiving a clearance to land, he scanned the runway twice but did not see the helicopter. As he was about to touch down, he did see the helicopter and commenced a go-around.

ANALYSIS

Flight planning

Despite agreeing to a date for the flight test a month earlier, the Cairns District Office did not organise the operation until the morning of the test. The CASA pilot just happened to be available at short notice and was not briefed on the requirements until approximately 4-5 hours before the flight.

The verbal pre-brief was not sufficiently adequate for the complexity of the task and did not specify the particular and unusual requirements of the test flight.

The phone facility to ATC was designed for general operations of local flights and not for "one-off" specific tasks of this nature. The complexity of the test was such that it required a specific pre-brief of ATC and a full flight plan, so that all parties were aware of the requirements. The phone plan left the controllers unsure of exactly what was going to happen. This situation resulted in control being based on individual descriptive requests from the helicopter crew as they happened and the belief that the runway was not going to be used after the initial approach.

Aircrew

While both aircrews complied with their respective clearances, each could have been more proactive in putting into place some form of safety net.

The pilot of the C182, by not reporting short final until over the threshold, did not give the ADC time to compensate for any error that may have been made.

The crew of the AS50 heard a landing clearance being given to the C182 but were unsure which runway was being used. They elected not to question the ADC as to the status of the runway.

Aircraft markings

The AS50 helicopter was painted in generally dark colours which made it difficult to see from above, especially above and behind. The lack of contrast between the grey blur effect of rotating rotor blades and the grey of the runway surface gave few visual cues to the pilot of the C182 as he approached to land.

Air traffic control

The controllers believed that the helicopter was operating clear of the runway strip most of the time and considered that the runway-15 PAPI tests were conducted on this basis. While it was unclear how many runs were made to the runway-15 PAPI site, there were in fact, several. However, each one resulted in a landing on the runway centreline and subsequent taxi to the grass areas inside the strip markers. That situation meant that during these runs, ATC were not providing a positive runway separation service between the helicopter and other runway users. However, due to the airborne phase of the test runs involving the centreline, airborne separation was provided at all times. No controller sought clarification of the status of the helicopter following its approach to the runway-33 PAPI site, nor during the previous manoeuvres involving the runway-15 PAPI site.

The belief that the helicopter was operating clear of the runway strip was reinforced by the sighting of grass below the skids and the fact that helicopters rarely use the runways at Cairns. It is normal for helicopters to arrive and depart via a taxiway or helipad and remain clear of the runway at all times.

Because of the late call on final from the pilot of the C182, the ADC had insufficient time to adequately scan the runway for any unexpected obstructions. The fact that he was reading at the time, albeit about the PAPI approach aid, further diminished the amount of time available to perform this duty. It may have also led to a short term loss of situational awareness.

The supervising ADC had been lulled into a false sense of security by the fact that the familiarising ADC was a rated controller who had been away for only 18 days. He was a bit tired and may have allowed himself to relax more than the circumstances warranted. He had also just left the console momentarily to find the PAPI information, and he thought that this action may have led to some loss of situational awareness.

SIGNIFICANT FACTORS

1. The preparation by the Cairns District Office did not contain an adequate plan for the flight test.

2. The CASA representatives did not adequately brief ATC.

3. Neither ADC maintained an adequate situational awareness.

4. The ADCs did not ensure that the runway was clear prior to issuing a landing clearance; contributing to this situation was the late "short final" call by the pilot of the C182.

SAFETY ACTION

As a result of the investigation:

1. The operator of the AS50 has painted white markings on the rotor blades to improve sighting opportunities from above.

2. The operator of the C182 has issued instructions for pilots to initiate a "final" call at least 300 m prior to the threshold.

3. Airservices Australia has replaced the tower blinds with a better quality product that reduces glare effect.