

**Aviation Safety Investigation Report
198803454**

**Piper PA28-161
Cessna 150-M**

24 April 1988

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Occurrence Number: 198803454
Location: 2.5 km N Archerfield QLD
Date: 24 April 1988
Highest Injury Level: Fatal
Injuries:

| | Fatal | Serious | Minor | None |
|--------------|----------|----------|----------|----------|
| Crew | 1 | 0 | 2 | 2 |
| Ground | 0 | 0 | 0 | - |
| Passenger | 0 | 0 | 0 | 0 |
| Total | 1 | 0 | 0 | 2 |

Occurrence Type: Accident
Time: 1517

Aircraft Details: Piper PA28-161 Cessna 150-M
Registration: VH-RQQ VH-TKR
Serial Number: 28-7916558 15079208
Operation Type: Private Aerial Work
Damage Level: Destroyed Substantial
Departure Point: Archerfield QLD Archerfield QLD
Departure Time: 1508 1513
Destination: Archerfield QLD

Approved for Release: 17th September 1991

Circumstances:

Both VH-RQQ and VH-TKR reported taxiing for circuits at 1500 hours. VH-RQQ was subsequently cleared for takeoff from Runway 10 Left (10L) at 1508 hours. During the first circuit by VH-RQQ, a Beechcraft Skipper, VH-HBI, was cleared for takeoff. VH-TKR was then cleared for takeoff and instructed by the Control Tower to follow the Skipper. VH-RQQ was then cleared to carry out a touch and go landing. The pilot of VH-HBI flew a wide circuit and VH-TKR, because of the instruction to follow VH-HBI, did not turn onto the crosswind leg of the circuit until reaching 1000 ft. VH-TKR was then flown downwind at a wider spacing than normal but inside the circuit flown by VH-HBI. VH-RQQ entered downwind close behind but inside the track flown by VH-TKR. At this stage, the Tower Controller asked the pilot of VH-RQQ "confirm you're following that Cessna I think he might be out to your half right now he's fairly wide". VH-RQQ responded "yes I got him in sight". The Tower Controller then asked "are you going to cut inside of him or are you following him?". VH-RQQ answered "I'm trying to follow him but he's getting a bit out of oh he's turning now I'll follow him". At about this time, VH-HBI turned from the downwind leg onto the base leg of the circuit and VH-TKR reported "downwind touch and go". The controller then provided VH-TKR with sequencing instructions in relation to VH-HBI turning base. Immediately following this instruction, the pilot of VH-RQQ initiated a radio transmission which was cut short by the collision between VH-RQQ and VH-TKR. The instructor in VH-TKR said that he first saw VH-RQQ positioned behind and to the left of his aircraft at what he estimated to have been about 200 m. He looked ahead to check the position of VH-HBI and when he looked back again to check VH-RQQ, he had insufficient time to take avoiding action before the aircraft collided. The instructor took control of VH-TKR from the student pilot immediately after the collision and was able to conduct a successful landing. The right wing of VH-RQQ was severed in the collision and the aircraft fell to the ground out of control. Examination of both aircraft showed that the collision occurred while VH-RQQ was converging at an angle of about five degrees with VH-TKR and overtaking at about 15 kts. The outer portion of the right wing of VH-RQQ

struck the rear of the left wing root of VH-TKR. At the time of the accident, the wind was from the north-east at 10 kts with scattered strato-cumulus cloud at 2500 ft. There were showers well to the west and south of the airfield. Visibility was estimated to be 40 km. The position of the sun was 17 degrees to the right of the circuit downwind track and 27 degrees above the horizon. While the climb and downwind speeds of the three aircraft were of the same order, VH-RQQ had the better performance, followed by VH-TKR and then VH-HBI. Two of the aircraft (VH-HBI and VH-TKR) were flying rectangular circuits, ie crosswind and base legs at right angles to the runway direction. VH-RQQ, on the other hand, was flying an oval circuit in which the crosswind and base legs were flown as continuous turns and which was shorter than a rectangular circuit. The nett effect of this was to accentuate the performance difference between VH-RQQ and the other two aircraft. It is possible that the pilot of VH-RQQ might have assumed that VH-TKR was departing the circuit area when that aircraft climbed straight ahead after takeoff to, eventually, 1000 ft. At the same time, he may have observed VH-HBI on the downwind leg and set himself to follow that aircraft. After turning downwind and seeing VH-HBI well wide on downwind, he may have had some concern over his ability to follow that aircraft. This concern could have been reinforced by the controller's transmissions relating to the "Cessna I think he might out to your half right now he's fairly wide". Analysis of the probable flight paths flown by each aircraft indicated that VH-TKR was in the region of abeam VH-RQQ when VH-RQQ began its downwind leg. It is possible that the pilot of VH-RQQ did not look in this direction when attempting to sight the "Cessna I think he might be out to your half right now he's fairly wide". Just prior to the collision, the student pilot in VH-TKR transmitted a downwind call. This call was late because of the interchange between the Tower and VH-RQQ. As a result of the downwind call by the VH-TKR, the Tower Controller sequenced VH-TKR to follow VH-HBI on base. The subsequent transmission from VH-RQQ which was interrupted by the collision could have at least two explanations. The pilot may have intended reporting mid-downwind, or he might have been seeking clarification as to the sequencing instruction just given to VH-TKR. There was no apparent attempt by the pilot of VH-RQQ to avoid colliding with VH-TKR. He was part way through a radio transmission at the moment of collision. His voice tone at that time was normal. It is possible to conclude, therefore, that the pilot of VH-RQQ did not see VH-TKR. However, he did indicate to the Tower Controller that he had sighted and would follow "that Cessna". (VH-TKR was a Cessna, a high winged configuration aircraft while VH-HBI was low winged.) On the basis of this positive response from the pilot of VH-RQQ, the Tower Controller was entitled to conclude that VH-RQQ had sighted and would follow VH-TKR. For the pilot of VH-RQQ not to have seen VH-TKR, he must have misidentified VH-HBI as a high winged Cessna. A number of aspects could have contributed to this. Firstly, the distance between VH-RQQ and VH-HBI was calculated to have been at least two kilometres at the time the pilot of VH-RQQ reported that he would follow "that Cessna". At the same time, the sun was within a cone of about 30 degrees of the line of sight from VH-RQQ to VH-HBI. The resulting glare could have caused reduced visual effectiveness for the pilot of VH-RQQ. Such other aspects as the contrast of VH-HBI against its background, and the complexity of the background itself, could also have limited the ability of the pilot to distinguish between a high winged and a low winged aircraft. The pilot of VH-HBI reported that he had just rolled out of the turn from downwind on to the base leg of the circuit when he heard the mayday call from VH-TKR. This indicates that VH-HBI could have entered the turn at about the time the pilot of VH-RQQ said "he's turning now I'll follow him". There were two other aircraft in the Archerfield circuit at the time of the accident which were not directly related to the incident. These aircraft were in the final approach path to the runway when the collision occurred. It was to these aircraft that the controller's attention was directed following the response from the pilot of VH-RQQ that they had sighted and would follow the "Cessna". General Aviation Airport Procedures (GAAP) were in operation at Archerfield at the time of the accident. Under these procedures, the Air Traffic Control responsibilities were to 1. apply runway separation standards, 2. issue instructions and/or traffic information to regulate traffic, 3. provide traffic information relating to possible conflicts inside the control zone in order to alert pilots that avoiding

action may be necessary, and 4. where practicable, maintain surveillance of aircraft activity within the control zone and on the aerodrome to endure a safe, orderly flow of traffic. Aircraft separation, other than on the runway, was not provided by Air Traffic Control. The pilot-in-command was primarily responsible for ensuring separation from other aircraft within a General Aviation Control Zone. The reason VH-TKR was instructed to follow VH-HBI was that the minimum runway separation standard (600 m) was being applied. No such direction was necessary with respect to VH-RQQ following VH-TKR as sufficient distance existed at the runway on DEPARTURE for VH-RQQ to remain separated from VH-TKR provided similar circuits were flown. Later, traffic information was provided to VH-RQQ concerning the possible confliction of that aircraft with VH-TKR and resolved to the controller's satisfaction. In hindsight, however, the information given to VH-RQQ about the position of VH-TKR ("half right fairly wide") was possibly ambiguous and open to misinterpretation by the pilot of VH-RQQ.

Significant Factors:

The following factors were considered relevant to the development of the accident

1. Of the three aircraft directly involved in the accident sequence, two flew rectangular circuit patterns while the third, VH-RQQ, flew an oval circuit.
2. It is possible that the pilot of VH-RQQ misinterpreted the information from the Tower Controller concerning the position of VH-TKR relative to his aircraft.
3. It is possible that because of the distance between VH-RQQ and VH-HBI, the position of the sun, and the visual contrast between VH-HBI and its background, that the pilot of VH-RQQ misidentified the (low winged) VH-HBI as (high winged Cessna) VH-TKR.
4. The pilot of VH-RQQ probably did not see VH-TKR before the collision.
5. The pilot of VH-TKR did not correctly assess the threat posed by VH-RQQ when he saw that aircraft behind and to his left.-