Aviation Safety Investigation Report 199601185

Air Tractor Inc AT-502

15 April 1996

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NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

Aviation Safety Investigation Report

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The Bureau did not conduct an on scene investigation of this occurrence. The information presented below was obtained from information supplied to the Bureau.

Occurrence Number: 199601185 **Occurrence Type:** Accident
Location: 20km ESE Collarenebri
State: NSW **Inv Category:** 4
Date: Monday 15 April 1996
Time: 1545 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: Air Tractor Inc
Aircraft Model: AT-502
Aircraft Registration: VH-XST **Serial Number:** 502-0098
Type of Operation: Commercial Aerial Agriculture - Other
Damage to Aircraft: Substantial
Departure Point: "Central" Collarenebri NSW
Departure Time:
Destination: "Central" Collarenebri NSW

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Commercial	130.0	11000

Approved for Release: Wednesday, August 28, 1996

The aircraft was engaged in chemical spraying operations. Before the first flight the pilot fuelled the aircraft to the 3/4 tab in both wing tanks. Prior to each subsequent operation the pilot refuelled only the left-wing tank to the 3/4 tab, as further chemical was loaded with the engine running. The pilot subsequently reported that on the fourth operation the engine momentarily lost power during a spray run. The fuel contents gauge indicated just above empty, but he could not recall which tank was indicating at the time. He decided to land and refuel, but the engine flamed out and the aircraft was substantially damaged in the ensuing forced landing.

Inspection of the aircraft determined that the left tank contained a substantial amount of fuel. However, only a small amount remained in the right tank. The fuel filter and header tank were only half full. The pilot reported that he had refuelled via the left tank only as the tanks were interconnected and designed to self level, and that it was a common practice on other agricultural aircraft he had flown. The pilot was trained and endorsed on Thrush aircraft, which automatically qualified him on the Air Tractor. His experience on the Air Tractor was relatively limited and he had not received training on system differences between the two aircraft types.

The fuel systems of the two aircraft differ primarily in the design of the header tanks and tank interconnection. The Thrush has a header tank of approximately 20-L capacity, gravity fed by a single line from each wing tank. The tanks self level through the header tank and interconnections. Engine fuel is drawn from the lowest point in the header tank. The Air Tractor's cylindrical header tank holds only 4.5 L, and is also gravity fed by a single line from each wing tank, designed to be self levelling. Engine fuel is drawn through a line positioned halfway up the rear face of the header tank.

By refuelling through the left tank only during the rapid ground loading operations, it is likely that fuel did not flow to the right tank as quickly as the pilot had expected. Also, the continual racetrack pattern being flown, coupled with any skid induced during turns, may have further exacerbated the imbalance in fuel quantities between the tanks. The right tank fuel quantity probably reduced to the point where any fuel sloshing in the tank uncovered the outlet, allowing air to be drawn into the header tank, resulting in a momentary loss of power. With the engine supply line positioned at the rear of the header tank, it is likely that the nose low approach attitude of the aircraft caused any remaining air in the tank to enter the supply outlet, causing the engine to flame out.

Safety Action

As a result of the investigation into this occurrence, and of a similiar event (BASI No. 9401685, VH-ODR), the Bureau of Air Safety Investigation forwarded the following Safety Advisory Notice to the Civil Aviation Safety Authority on 01 July 1996.

'SAN 960052
The Bureau of Air Safety Investigation suggests that the Civil Aviation Safety Authority, in consultation with the US Federal Aviation Administration, review the fuel system design of aircraft conforming to Type certificate A17SW to ensure the adequacy of the fuel system with all applicable airframe/engine combinations.'

The Civil Aviation Safety Authority responded on 18 July 1996, stating in part:
'I have written to the President of Air Tractor, and the Small Airplane Directorate of the Federal Aviation Administration, advising them of the fuel starvation incidents in Australia and asking for their comments. I will advise of the responses when I receive them.'

The Bureau is addressing pilot systems training in another accident investigation (BASI 9600323, VH-BRN).