Aviation Safety Investigation Report 199701407

Piper Aircraft Corp Chieftain

01 May 1997

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Occurrence Number: 199701407 **Occurrence Type:** Incident
Location: 15km W Camden, Aerodrome
State: NSW **Inv Category:** 3
Date: Thursday 01 May 1997
Time: 1642 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: Piper Aircraft Corp
Aircraft Model: PA-31-350
Aircraft Registration: VH-XLA **Serial Number:** 31-7952206
Type of Operation: Air Transport Domestic Low Capacity Passenger
Damage to Aircraft: Nil
Departure Point: Cowra NSW
Departure Time: 1616 EST
Destination: Sydney NSW

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL	1275.0	2550

Approved for Release: Wednesday, November 26, 1997

FACTUAL INFORMATION

The pilot in command of a scheduled passenger service from Sydney to Cootamundra, via Cowra, discontinued the flight with the assigned aircraft due to a mechanical problem experienced during engine start at Cowra. The chief pilot had also been on board the aircraft, observing the flight procedures of the pilot in command. The scheduled service was subsequently completed by the pilot in command using a substitute aircraft, VH-XLA, which had been dispatched from Cootamundra.

After landing at Cootamundra the aircraft was taxied to the fuel bowser and shut down. In anticipation that he would be refuelling the aircraft, the pilot in command left a written note for the next rostered pilot which stated that the main fuel tanks were full. At about this time the chief pilot chose to carry out a debrief of the flight with the pilot in command. The two men sat down in the rear of the aircraft to discuss the flight. Whilst the debrief was in progress, a company engineer boarded the aircraft and taxied it to the hangar for routine maintenance. The pilot in command reported that he was distracted by the debriefing and did not subsequently return the aircraft to the fuel bowser to complete the refuelling process. In addition, the maintenance release (MR) did not show that the aircraft had been flown from Cootamundra to Cowra and return, nor were details of the flight, and fuel remaining on board at the completion of the flight, documented in other company records. The operator had planned to use the same aircraft for the scheduled afternoon service to Sydney via Young and Cowra.

The pilot rostered for the afternoon service arrived at 1300 EST to carry out a pre-flight inspection. Company fuel policy for that service required a minimum of full main tanks. Fuel records indicated that the main fuel tanks of VH-XLA had been refilled on the previous evening, information which was supported by the note left by the previous pilot. One of the company engineers, who was queried by the pilot, was not aware that the aircraft had been flown that morning but added that the engines had been run at considerable power for about 10 minutes. The pilot later reported that his observation of the fuel gauges confirmed the tanks were close to full. However, he did not carry out a visual inspection of the fuel levels in the tanks prior to departure. The aircraft subsequently departed Cootamundra at approximately 1525.

During climb after departing Cowra, the pilot observed the fuel gauges indicating less than he would normally have expected at that stage of the flight. He elected to cruise at 7,000 ft, and reduced power in order to decrease fuel flows. The pilot also contacted the company head office about possible fuel gauge anomalies. As the aircraft approached Bindook, the pilot carried out a further check of the fuel gauges and chose to land at Camden as a precautionary measure. A PAN call was transmitted to Flight Service, and the passengers were advised that the aircraft would be landing at Camden due to a low fuel indication. The pilot executed a normal landing following a straight-in approach.

Two hundred litres of fuel were added to the main fuel tanks in order to complete the flight, but the pilot was unable to start the left engine. Ground transport was subsequently used to take the passengers to Sydney. A further 182 L were added to fill the main fuel tanks, bringing the total amount of fuel added at Camden to 382 L. The combined usable fuel capacity of the main tanks is 402 L.

An engineering examination of the aircraft did not reveal any anomalies with the fuel system or fuel quantity gauges which may have contributed to the incident. It was determined that the pilot had used an incorrect start procedure at Camden, causing problems in starting the left engine. Fuel calculations, based on the company fuel policy, indicated that the aircraft had departed Cootamundra with approximately 250 L on board, equivalent to about two-thirds of the combined fuel capacity of the main tanks. The actual fuel required for the flight, including 113 L of standard reserves, was calculated to be 358 L.

The pilot held a valid licence and ratings for the operation being undertaken. He had commenced full-time employment with the company on 24 January 1996 after working part-time with the same company since early 1995. He had accumulated 1,275 hours in Piper Chieftain (PA31) aircraft, all of which had been flown in company aircraft.

The pilot believed that fuel would not be visible in the main tanks, as viewed through the filler caps, if any more than a few minutes of fuel had been burned. This did not appear to be a view held by other company personnel. Moreover, the pilot indicated that had he visually inspected the tanks prior to departure from Cootamundra, and not been able to see fuel, he would still have concluded he had sufficient fuel based on all other available information and the knowledge that the engines had been run for approximately 10 minutes during maintenance checks. A number of operators of Chieftain aircraft were consulted, all of whom said that a total of some 300 L remained in the main fuel tanks when fuel was just visible on the sloping bottom surface of each tank.

The company aircraft checklist required that, as a minimum, the fuel gauges/contents are to be checked prior to start-up and during the pre-takeoff procedure. However, the pilot confirmed that following his first observation of the gauges during the pre-flight inspection, he did not check the gauges again until he had departed Cowra. He reported that he had experienced a high workload on this flight, due to a full complement of passengers and a significant amount of baggage to deal with, and had overlooked this check. Since he also assumed the main fuel tanks had been full when the aircraft departed Cootamundra, he did not expect the fuel gauges/contents to be a checklist item requiring close and frequent attention.

ANALYSIS

The responsibility of ensuring that there was sufficient fuel to complete the flight rested with the pilot of the afternoon service. However, the incident resulted from a chain of errors and omissions involving a number of company personnel, which ultimately led to insufficient fuel being on board the aircraft to complete the scheduled flight from Cootamundra to Sydney.

In the first instance, the MR had not been certified by the pilot who ferried the substitute aircraft to Cowra. In the second instance, the pilot in command who had completed the scheduled flight in the substitute aircraft, did not complete the flight details nor certify the MR. In addition, the pilot in command was normally in the habit of completing the note, which indicated that the main tanks were full, before leaving his control seat immediately prior to refuelling. However, his normal routine had been interrupted when the chief pilot chose to debrief him before he had time to complete all required administrative and refuelling tasks. His pre-occupation with the chief pilot's critique of his flight subsequently led to these tasks being forgotten.

As a result of the oversights which occurred during the morning, the supporting documentation available to the pilot rostered for the afternoon service did not indicate that a flight had taken place in the aircraft earlier that day. The note left by the pilot of the earlier flight indicated that the main fuel tanks were full. In addition, the pilot's understanding of the fuel system was incorrect. This is considered to be the most significant factor in the chain of events. It was ultimately his responsibility to determine that there was sufficient fuel for the flight. He did not carry out a visual check of the main fuel tanks. However, even if fuel had not been visible, his assessment of the fuel quantity would not have altered. Because of his inadequate knowledge of the fuel sysyem, such an observation would not have alerted him to the discrepency between the fuel documentation and the actual fuel contents.

The pilot's understanding of the aircraft's fuel system differed with that of his peers within the company, and with other operators of the aircraft type. In addition, this understanding was inconsistent with the general view held by other company personnel that he displayed competence and professionalism in his flying duties. The investigation was unable to resolve this inconsistency.

It was determined that the fuel gauges should have indicated a maximum of three-quarters full at the time of the pre-flight inspection. It is considered probable that the pilot's observation of the fuel gauges reading close to full prior to departing Cootamundra was strongly influenced by the other fuel-related information available to him prior to departure. This expectation was then carried throughout the rest of the flight until he finally became aware of the apparently low-reading fuel gauges after leaving Cowra. Even at that stage he thought the readings were incorrect, but wisely decided to land at Camden as a precaution.

SIGNIFICANT FACTORS

1. The maintenance release had not been certified, and details of the morning flight in the substitute aircraft, including flight times and fuel remaining, had not been documented.

2. The pilot in command of the morning flight had written a note stating that the main fuel tanks were full but was distracted from his duties and did not complete the refuelling process.

3. Other documentation indicated that the main fuel tanks were full.

4. The pilot rostered for the afternoon flight did not visually inspect the fuel tanks, nor would he have changed his assessment of the fuel quantity if he had, given the information he had available to him and his incorrect understanding of the fuel system of the aircraft.

5. Due to a high workload, the pilot did not check the fuel quantity gauges in accordance with company procedures prior to departure from both Young and Cowra.

SAFETY ACTION

As a result of this occurrence, and in consultation with the Civil Aviation Safety Authority, the company has reviewed its policies and procedures in relation to the checking and documentation of fuel quantities in PA31 aircraft. The company Maintenance Control Manual was amended to ensure that a visual inspection of the fuel tanks was included in the pre-flight inspection.