Aviation Safety Investigation Report 199500988

Piper Aircraft Corp
Seneca

03 April 1995

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Occurrence Number: 199500988 **Occurrence Type:** Accident
Location: Tyabb
State: VIC **Inv Category:** 4
Date: Monday 03 April 1995
Time: 1340 hours **Time Zone** EST
Highest Injury Level: Serious
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	0	2	0	0	2
Ground	0	0	0	0	0
Passenger	0	0	0	0	0
Total	**0**	**2**	**0**	**0**	**2**

Aircraft Manufacturer: Piper Aircraft Corp
Aircraft Model: PA-34-200
Aircraft Registration: VH-WJP **Serial Number:** 34-7450155
Type of Operation: Instructional Dual
Damage to Aircraft: Destroyed
Departure Point: Tyabb VIC
Departure Time: 1255 EST
Destination: Tyabb VIC

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL	100.0	3900

Approved for Release: Wednesday, October 2, 1996

The chief flying instructor was conducting initial multi engine endorsement training for a commercial pilot. It was the student's fourth session. After practising simulated engine failures at about 3000 ft in the training area, the aircraft was flown to Tyabb for circuit training.

On the third circuit, on base for landing to the south on the 1000 metre airstrip, the instructor failed the right engine by placing the mixture lever into the idle cut-off position. He told the student not to feather the right propeller but to continue with a touch-and-go landing, thereby experiencing an approach and landing with a failed engine and an unfeathered propeller. The student selected two stages of flap and, on final, placed both propeller pitch levers into the full fine position. She closed both throttles before touchdown. During the landing roll the instructor raised the flaps and advanced the right mixture lever to the full rich position. Then the student advanced both throttles fully, expecting takeoff power on both engines. At this point the indicated airspeed was about 70 knots. The minimum control speed for single engine operations is 69 knots. The left engine produced takeoff power but the right engine failed to deliver power.

Initially, when the aircraft began to yaw to the right, the instructor thought the student was having difficulty with directional control which she had experienced on previous landings. However, when the aircraft yawed further right, he identified a failed right engine and quickly took over the controls. By then a collision with runway lights, gable markers and a shallow drainage ditch was imminent, despite the application of full left rudder by the instructor. He chose to maintain full power on the left engine and become airborne, hoping to avoid the obstacles immediately ahead and find a clearer area to land. The aircraft flew for about 290 metres at a low height in a southerly direction within the airfield boundary but outside the runway gable markers with the instructor struggling to maintain control. Then the right wing collided with a two metre high pile of old stumps.

The outboard section of the right wing, including the outboard fuel tank, was torn off. The aircraft turned right through about 260 degrees while remaining upright. It then settled onto the ground and slid backwards, coming to rest about 30 metres beyond the stumps. As the aircraft came to rest it caught fire. The right wing spar was completely broken and the right engine was torn out of the airframe. The pilot and the student escaped through flames. Fire quickly gutted the cabin.

In the seconds between taking over the controls and impact with the stumps, the pilot did not attempt to feather the propeller of the failed engine because of the difficulty he encountered controlling the aircraft at low airspeed. If the RPM of the windmilling propeller had decreased below 800, which it probably had, then feathering would have been prevented by the design of the propeller mechanism.

The airframe was subsequently examined by engineers who found no fault which may have contributed to the accident. No fault was found with the left engine which had produced takeoff power on demand. No fault was found with the right engine. Aviation gasoline was found in the fuel lines and in the fuel tanks. There was adequate fuel on board for the flight. The cockpit switches were destroyed by fire.

From the time the instructor selected the mixture to idle-cutoff until the student attempted to achieve takeoff power during the attempted touch-and-go landing was probably less than than two minutes. The reason the fuel injected engine did not restart when the mixture lever was advanced was not determined. Witnesses reported hearing a "backfire", probably from the right engine, at about the time full power was selected.

Initially when the right engine failed to deliver power, there was sufficient remaining runway ahead for the pilot(s) to have closed the throttles and stopped the aircraft safely before the end of the runway. The student, who considered closing the left throttle, did not dare to do so once the instructor took over. Having taken over the controls, the instructor was confronted with obstacles immediately ahead, which he cleared by becoming airborne. He was then confronted by another obstacle, the pile of stumps which he was unable to avoid.

Four or five times in this aircraft, recently, the instructor had successfully performed a touch-and-go landing after shutting down an engine with the mixture lever during multi-engine endorsement training; once per candidate towards the completion of their endorsement. On all previous occasions the shut down engine produced full power when the mixture lever was advanced and the throttle opened fully. The instructor's hope was that the training exercise would be a valuable experience for the students. However, in hindsight he realised that the exercise enhanced the chances of an accident occurring if the shutdown engine did not restart quickly during the touch-and-go.

Since this accident it has become apparent that many multi engine flying instructors, approved testing officers and flying operations inspectors have varying opinions as to whether engines should be shutdown completely in the circuit or at low level, as opposed to selecting zero thrust settings appropriate to the particular aircraft.

CONCLUSIONS

Findings:

1. The instructor and student were properly licenced and qualified for the task.

2. The aircraft was serviceable and after the accident no faults were found that may have contributed to the accident.

3. The right engine did not deliver power when the mixture and throttle levers were advanced for the touch and go landing. The reason why the right engine did not restart was not determined.

4. The flying instructor underestimated the risk involved versus the training advantage of shutting down one engine at low level followed by a touch-and-go landing.

Significant factors

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

1. The instructor shut the right engine down during approach.

2. The instructor briefed the student to fly the approach and land with the engine shut down and the propeller windmilling.

3. During the subsequent touch and go landing, the engine did not restart/deliver power when the mixture and throttle levers were advanced.

4. When the aircraft then began yawing to the right the instructor initially believed the student was having ongoing difficulty with directional control.

5. When the instructor identified that the yaw was due to asymmetric power and took control of the aircraft, the situation with aircraft performance, runway remaining and surrounding terrain was such that an accident was inevitable.

SAFETY ACTION

The following safety action is being taken:

1. The Civil Aviation Safety Authority (CASA) will release a Civil Aviation Advisory Publication containing an initial multi engine endorsement training syllabus.

2. The Bureau of Air Safety Investigation will conduct a research project on advanced training accidents.

3. Since this accident, CASA has held industry symposiums to discuss standardisation of multi engine training procedures.