

AIRFRAME HISTORY

The airframe of Mitchell Mk III AI series TB25K, RCAF No. 5276, received a major overhaul by North West Industries in 1953 after being transferred from the USAF. Log books prior to this time are not available; however the flying time on transfer was 1255 hours, 10 minutes. It was then transferred to RCAF Station Winnipeg on 22 Oct 1953 and was maintained under contract by Trans Canada Airlines. In Jan 54 it was returned to North West Industries for further modification and in March 1954 was returned to Station Winnipeg still under T.C.A. maintenance.

The total flying time since new is 1722 hours and 45 minutes. Perusal of the log book does not show any major or minor unserviceabilities that could have attributed to this accident.

17. ENGINE HISTORY

Port Engine

The engine, a Wright Cyclone, series 2600-29A, serial number 43-200848, was installed in Mitchell 5276 on 16 Feb 54 with total running hours of 5 hours 25 minutes. Prior to this the engine had received a complete overhaul at 687 hours and 10 minutes. Perusal of the log book indicates that the engine had not suffered any major or minor unserviceabilities that could be a contributing factor to this accident. Its total running time since overhaul was 467 hours 35 minutes.

Starboard Engine

The starboard engine, A Wright Cyclone, series 2600-29A, serial number 43-43702, was installed in airframe 5276 on 16 Feb 54, after completion of a complete overhaul at 2376 hours and 10 minutes. Perusal of the log books gives no indication of any major or minor unserviceabilities that could have attributed to this accident. Total running time since installation was 467 hours 35 minutes.

The propellers, both Hamilton Standard hydromatic, numbers RR 1560 and PRE 5235 were installed on 17 Feb 54. Their log books show that they have given good continuous service since installation.

18. REFUELLING

The aircraft was refuelled at 1300 hours on 7 Dec with 374 gallons, bringing its total capacity to 812 gallons. The aircraft did not carry auxiliary bom-bay tanks.

19. LOADING

The aircraft was weighed by North West Industries Ltd. during overhaul and a provisional weight and balance sheet was compiled. The reason a completed weight and balance data sheet was not compiled by North West Industries was that the radar equipment classified as 'secret' was not installed in the aircraft, nor was its weight or position in the aircraft given to North West Industries. Therefore, the proper weight and balance of this aircraft cannot be determined. As a result of this investigation all Mitchell AI aircraft on strength to MacDonal Bros. Aircraft Company have been reweighed and a new weight and balance sheet tabulated within the past week. According to the new weights the centre of gravity of the aircraft is not changing any appreciable amount and the average weight increase is 1342 pounds. The following is the suspected weight of the aircraft at takeoff.

Basic Weight	17,771 pounds
Fuel (812 Imp. Gals.)	5,846 pounds
Oil	558 pounds
Crew and parachutes	1,200 pounds
Estimated Radar Equipment	1,342 pounds
Gross weight	27,712 pounds
Maximum Gross Weight	34,000 pounds.

20. CIRCUMSTANCES OF THE ACCIDENT

The aircraft took off at 1330 hours C.S.T. on an air interceptor exercise on 7 Dec 54 for 3 hours and 30 minutes, the exercise originated and was to terminate at RCAF Station Winnipeg, Manitoba. At 1618 hours C.S.T. the aircraft PX'd by the range at 8000 feet and was told to hold on the West leg of Winnipeg radio at an altitude of 1000 ft. on top. Some time during the holding pattern the pilot requested a specific altitude as, while he was holding 1000 ft., on top, he was getting mixed up with five other aircraft holding 1000 on top (this stumps me.) He was then given a specific altitude of 8000. During his holding he was lowered in the stack 1000 feet at a time, with his last holding altitude being 3000 feet. At 1728 C.S.T. the tower called him to give him clearance; he answered the transmission by saying 'make it fast. I just lost an engine' His clearance reads: "You are cleared to the Winnipeg Airport for a standard range approach; advise when leaving 3000." The pilot reads back the clearance and stated "I am now at 2000." This was the last transmission heard from the aircraft. The instructor navigator in his evidence (see Appendix "A") states that within 30 seconds of the port engine failing the starboard engine failed.

The aircraft struck the ground travelling in a Westerley direction 250° Magnetic in a slightly starboard wing down attitude at an angle to the horizontal of approximately 20°. The aircraft immediately started to rip apart with both wings ripping off, both engines tearing loose and the tail section breaking off in one unit. (See attached sketch.)

21. HISTORY OF THE PILOT

Number 216098 F/O J. W. Daly, a member of the RCAF Regular started his pilot training at No. 1 FTS Centralia in May 1953. At FTS he trained on Chipmunk and Harvard aircraft, graduating in Jan. 1954. From FTS he was posted to No. 1 AFS Saskatoon, graduating from there on Mitchell aircraft in Jun of 54. Following AFS he was posted as staff pilot on the Mitchell flight at 2 ANS Winnipeg, Manitoba, and remained on strength to this unit until his untimely death on 7 Dec 1954. The following is a breakdown of his flying times;

	<u>DUAL</u>	<u>SOLO</u>	<u>INSTRUMENT</u>
Chipmunk	18 hrs. 30 mins.	7 hrs. 15 mins.	30 mins.
Harvard	119 hrs. 55 mins.	63 hrs. 55 mins.	44 hrs. 35 mins.
Mitchell	73 hrs.	243 hrs. 30 mins.	68 hrs. 5 mins.
Expeditor	20 hrs. 25 mins.	161 hrs. 5 mins.	-

22. EXAMINATION OF THE AIRCRAFT

The aircraft struck the ground in a slightly starboard wing down attitude, the first contact point with the ground being the starboard wing tip, propeller and lower cylinders of the starboard engine. The wing down attitude of the aircraft on contact gave the aircraft a twisting motion which resulted in the rear section of the fuselage breaking off just back of the well. This also caused the port wing to tear loose at the root and travel in the direction of flight as a free air foil. At this point the port engine tore loose (see sketch for wreckage scattered.)

Examination of the cockpit showed that the pilot was not attempting a forced landing but was trying to get one or both of his engines back into operation. This is born out by the fact that both fuel booster pumps were on, both transfer pumps were on and the cross feed cock was on. However, it is estimated that most of this action was nullified when the pilot inadvertently selected his starboard fuel cock off. The selection of the starboard fuel cock to the off position is verified in three ways:

PE

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- (a) The selector in the cockpit was in the off position.
- (b) The gas cock for the starboard engine was in the off position. PE
- (c) The twisting of the fuselage during the crash would have the effect of stretching the bowden cable which would tend to open ~~in~~ the fuel cock.

The port fuel cock was nearly fully open but unfortunately the selector in the cockpit was missing, having been cut away when one of the blades of the port engine ripped a hole vertically through the fuselage during the crash. To further verify the above findings that the pilot was attempting to start his engine is shown by the engine fire extinguisher having been selected to the port engine but not triggered off. Further readings in the cockpit are as follows. The undercarriage was in the up selection, as was the flaps. This is further verified from examination of the wheel and flap jacks; the carb heat was selected cold, the cowl flaps in a halfway position, the elevator trim in neutral, aileron trim 8° left wing up, and rudder trim 4° left. The mixture pitch and throttle controls were all forced to the fully forward position and all instruments except the altimeter, were smashed beyond recognition. The altimeter reading checked with that given by the tower. The starboard wing was completely demolished. However, the port wing was in tact, the only damage being in the area of the nacelle which was caused when the engine tore loose. The main tanks were punctured but the auxiliary tanks still contained a goodly amount of fuel. The cock-pit area to the rear of the bomb-bay was burned out, the most extensive burning being in the area of the bomb-bay. The well of the fuselage was still fairly in tact having suffered only impact damage and slight fire damage. The rear fuselage broke in two places, the initial break was just forward of the dinghy stowage. The second break was just ahead of the horizontal stabilizer. The starboard fin and runner were torn off but the port fin and rudder was still in one piece. (See Photographs in Appendix "B".)

23. Examination of the Engines

Starboard Engine

The starboard engine tore loose on impact but suffered only slight damage to the cowlings and a few of the lower cylinder rocker boxes. Examination of the fuel system showed that the throttle linkage on the carburetor was jammed in the full open position and the mixture control was in auto-rich. The carb filter and main fuel filter were clean as was the oil filter. The fuel pump was checked and declared serviceable. The fuel booster pump was also declared serviceable. The propellor was in full fine pitch, and by turning the prop it was possible to rotate the pistons. A check of all cylinders showed them to have suffered only crash damage. The engine was not affected by fire, either in the air or on the ground. The magnetos and plugs were checked and found in a serviceable condition.

23. Port Engine

The Port Engine was ripped from the wing, but suffered very little impact damage, as much of the shock was taken on one blade of the propeller. It was determined that this broken blade was also the blade that cut through the side of the fuselage. The cylinders were all in good shape with the exception of number six which had six of the front cap screws torn out of the crankcase casing. However as all the other hold-down screws of the cylinder were securely fastened and the absence of oil in the immediate area, it is considered that this damage was due to impact.

Examination of the fuel system showed that the carb fuel filter and the main fuel filter were in a good clean condition. The carburetor controls were considered unreliable as the mixture linkage was torn loose from the carb and the carb itself torn from the engine. The fuel pump was tested and found to have a ruptured diaphragm. (This could not be attributed to impact damage as the pump was still installed and had not suffered any distroction.)

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In view of statement at top
of page it is assumed Gardie
means that the fuel starvation
occurred because he was out
of fuel on the port side. This
requires clarification.

Gardie confirms engine died
of fuel starvation because of
fuel exhaustion in port main
tank.

JFB
15/1/82

The defective pump was placed on a serviceable engine and tests proved that although the engine would function normally under any throttle or mixture setting, the pump was delivering 20 gals of fuel to atmosphere for every 50 gals. delivered to the carburetor. This rate of flow did not change with booster on or off, and with boosters off, the fuel pressure registered a normal $6\frac{1}{2}$ lbs.

With booster on, the fuel pressure jumped four (4) lbs. (This should not happen) This test was carried out by attaching one end of a length of hose to the pump drain line and placing the other end in a bucket. It can be appreciated, that had the drain line been open to air flow, such as it would be when the aircraft was airborne, the overflow of fuel would be considerably greater.

24. Crew Protective Equipment.

All crew members except the co-pilot were strapped in their seats, with their lap and shoulder straps properly adjusted. All seats in the aircraft ripped loose from their moorings, however no two seats gave was in the same manner. This is feasible due to the twisting motion of the aircraft on impact and it is doubtful, if the seats would have held, even if they had been installed by the Dominion Bridge Co.

25. Findings.

- (a) No. 216098 - F/O J. W. Daly.
No. 48520 - F/O A.G. Adam and
No. 38912 - F/O G. R. Hans, were members of the Armed Forces, and were on duty at the time of the accident.
- (b) All Flying and Maintenance Regulations were in order except the Weight and Balance Sheet, which had no bearing on this accident.
- (c) The aircraft struck the ground in a slightly starboard wing-down attitude at an angle of approximately 20° to the horizontal. The aircraft then broke into three main pieces, with fire breaking out in the aircraft well area, completely consuming the bomb-bay area and causing moderate damage to the cockpit area.

26. Conclusions

It is assumed that the reason the co-pilot was not strapped in is that it was he who had turned on the fuel cross-feed valve in a desperate effort to get fuel to one of the engines (the cross-feed valve is in the aircraft well and cannot be operated from the cockpit.)

It is further assumed that the Captain threw on all fuel switches in a final attempt to restart one of the engines but the action was taken at too late a time for the combination of booster pump and cross-feed valve to take effect before the aircraft struck the ground. It is concluded that the port engine failure was a direct result of fuel starvation caused by the ruptured diaphragm in the fuel pump venting a goodly portion of the available fuel to atmosphere. This is born out by the following information:

made → A Standard Operating procedure is that after approximately 70 gallons of fuel has been consumed, the pilot to ensure that his booster pumps are operating satisfactorily, transfers fuel from the auxiliary tanks to the main tanks until the main tanks are again up to capacity. At the normal rate of fuel consumption (checked from fuel consumption reports over the last six months) of 50 gals. per hour would give the pilot $5\frac{1}{2}$ hrs. flying on main tanks only (gallonage of main tanks 279 Imperial per each engine).

This, plus the seventy (70) gallons transferred at the beginning of the flight would guarantee a flight time of $6\frac{1}{2}$ hrs before transfer of more fuel was necessary. However, as stated by the navigator, the pilot found it necessary to transfer fuel while awaiting landing clearance after a four-hour flight. It is therefore apparent that ~~mal~~mal-functioning fuel pump was delivering nearly as much fuel to atmosphere as it was to the engine. It is considered that the cause of this accident was primary, pilot error, secondary, material.

27. RECOMMENDATIONS

Nil.

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