

AIRCRAFT ACCIDENT 9M - PIC
AT PADANG KUBU, TRENGGANU
ON 15th AUGUST, 1982

At about 1600 hours a Department of Civil Aviation official was informed of an aircraft accident involving one aircraft which crashed in a fish pond whilst conducting a crop dusting operations at Air Puteh Airstrip, position at 0417 NORTH 10311 EAST. The aircraft crashed soon after becoming airborne, from this airstrip and from a height of within 200 feet above ground level.

1.1 History of Flight

The pilot came to work at about 0830 in the morning to conduct his crop dusting flights. The first flight was carried out without much hitch at 0845 and the aircraft was flown for almost two hours before the first stop for refueling. The average performance of crop dusting was estimated as 18 landings and take-offs with a distant of 2nm from the airstrip to the spray area. On this day the aircraft completed 8 take-offs and landings before it went for refueling at same location. Soon after refueling the pilot inspected the aircraft and started the engine for further crop dusting operations. On the 3rd take off, almost immediately after take off on the straight Northly heading the aircraft began to experience severe vibrations and loss of power. The aircraft was then seen to be decending from 200 feet to 50 feet at a fairly fast rate. At about 20 feet above ground the engine finally stopped and the aircraft plunged instantaneously into a man made fish pond at 1145 am.

Two witnesses from the local area who were very close to the tarmac road, running along the northly heading to the left of the pond saw the accident happening in front of their eyes. The leading witness was splashed by the water from the pond as the aircraft plunged it.

The pilot was rescued by these two witnesses and assisted by on-lookers who crowded the area fairly quickly. The local police was informed and the pilot was hospitalised for 30 days at the General Hospital in Kuantan which is 40 miles away. The investigation began as soon the authority was informed and investigators arrived at the scene of the accident the following morning 16th. August, 1982.

1.2 Injuries to persons:

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	1	-	-
Minor/None	-	-	-

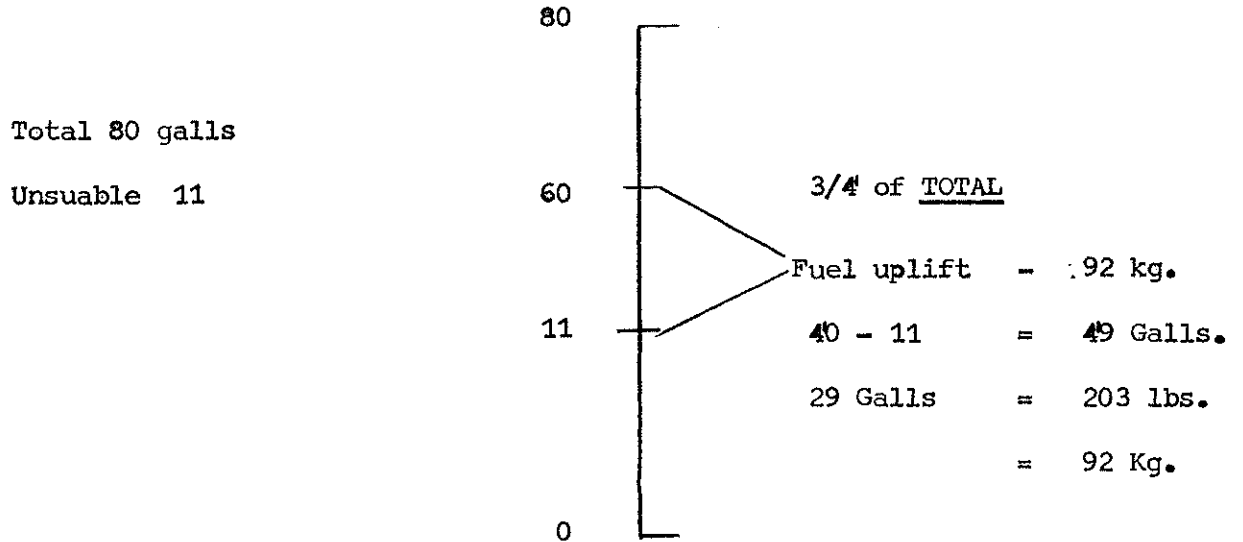
(9M - PIC

1. Operating Weight - 1077.55 kg.

- Includes Pilot
- Unusable fuel.
- Full Oil
- 4 fuel tanks.

2. Fuel Load.

Estimated at 1/2 full



3. Hopper Load

Restricted to 1/2 Ton (Training load limit)

Say 1 short ton = 2000 lb.

= 1000 lb.

= 454 kg.

- 454 kg.

MAX WEIGHT:

1623

AGRICULTURAL MAX WEIGHT :

1855

The pilot was seriously injured with 3 broken left ribs and contusion of the lungs. His left leg was broken at the femur area, and he was unconscious for more than 24 hours.

1.3 Damage to aircraft

The aircraft was destroyed by the tremendous force when it struck the water at close to flying speed (between 80 to 90 knots). The engine was completely detached from the mounting and separated from the main fuselage. Both tail-plane and rudder were severed by strong side force as the aircraft banked to the right during the impact. Compression damage was evident on the leading edges of the wings. Although the main cockpit construction was intact the lower left section of the cockpit around the left rudder pedal area caved in from underneath, pushing the left rudder pedal upward. There was no evidence of any fire and the aircraft was in a tilted nose down position resting at an angle of 45° to the horizontal, with half the lower portion under water.

1.4 There was no other damage except that the fish pond was polluted by gasoline and unsuitable for further fish breeding.

1.5 Personnel information

a) The pilot is an Indonesian citizen, age 46 years who in the last 4 years has been flying in Indonesia with a valid agricultural rating. Total flying hours of around 6000. He first came to Malaysia to fly with a local company and had not completed the minimum hours on type as stipulated by the Department of Civil Aviation at the time of the crash. He had a valid licence and validation for the purpose of this operations. Further restrictions were also included, the pilot was required to complete 20 hours under supervision before the next check out by the Department's official.

1.6 Aircraft information

The aircraft is a single seat TRANSAVIA PL 12 Airtruk manufactured in Australia by TRANSAVIA CORPORATION PTY LTD. Imported into the country in February, 1982. This aircraft has been authorised and approved by the authority to conduct flights for the purpose of crop dusting within the country. At the time of accident the aircraft was in Airworthy condition. The next maintenance due to be completed by 5th. October, 1982 or before exceeding a total flying time of 289.55 hours.

There was no indication of discrepancies known or found except the ignition switch was selected to the L.H. magneto only and the aircraft had been flying within the limits of the operations manual. At the take-off immediately prior to the accident the hopper was 1/2 full and with the pilot, together with 1/2 tank full of fuel the weight was estimated as 1600kg, a little below the maximum operating weight.

The centre of gravity was within the prescribed limits at the time of the accident. The fuel was sampled and inspected after the accident and found satisfactory.

1.7 Meteorological information

The weather conditions were reported as good with visibility more than 15 km with little or no clouds. Wind was calm with the temperature of 30 C.

1.8 Aids to Navigation:

No aids of navigation was used for the purpose of this flight.

1.9 Communications

No communications facilities were used for the purpose of flight as there was no requirement for this area.

1.10 Airstrip Information

The airstrip is a new airstrip, recently inspected by DCA Malaysia and certified fit for crop dusting operations only.

1.11 Flight Recorders

Nil

1.12 Wreckage and impact information

All the pieces of the aircraft were found at one spot, that is in the fish pond, however a broken piece of the propeller tip was not found.

1.13 Medical and pathological information

The pilot suffered a severe shock and was unconscious for more than 24 hours. The concussion on the helmet cause it to crack and saved the pilot from severe head injury. However the force from the seat belt cause his collar bone to crack and 3 left ribs were broken with contusions to this left lung. His left leg was broken at the main femur.

1.14 Fire

There was no fire before or after the crash.

1.15 Survival aspects

The accident was survivable but it was noted that the harness inertia reel was not in the lock position prior to the crash. The helmet was a major factor that prevented any severe or fatal injury to the head.

1.16 Test and Research

The loss of are propeller blade tip is difficult to, explain. The energy required to break the blade cannot be easily related to the engine power at time of the accident or the nature of the final impact into water or soft mud.

The fracture face has been sent to U.K. CAA where it is hoped an expert opinion from the Accident Investigation Branch may explain the nature of the failure.

If there is doubt as to whether the tip was missing in flight, which would give rise to severe vibration, then more tests will be necessary on engine accessories in an attempt to find why the engine stopped.

1.17 Additional information

Nil

1.18 Analysis

From the accident site and wreckage information it was evident that there was little or no power moment prior to impact. This can be seen from the blades conditions. Further information from the two witnesses confirmed that this had happen before the crash. One witness noted that there was a prominent unsynchronised sound coming from the engine 15 seconds before the engine stopped. This occurred from a height of 200 feet followed by a descent to 20 feet before the aircraft dived steeply into the pond.

Evidence from the pilot's interview were also accounted for. Although most of the details action done by the pilot prior to impact were vague, the engine failure in flight was fairly conclusive, and a sudden vibration just after take off was the most remembered moment that he can recalled.

This again were verified by the ground witnesses. Several actions appear to have been taken by the pilot when the engine began to splutter and vibrate, the hopper load was released and the throttle was adjusted to full power from level power. When the engine finally stopped about 20 feet above ground level he was left with no choice but to allow the aircraft to take its own course.

1.19 The investigation cannot be concluded at this point.

ACCIDENT TO 9M-PIC TRANSAVIA PL-12

The following notes summarise some of the findings to date and comment on areas where investigation has not proceeded or answers have not been found. At this time a number of observations must be speculative.

Evidence, eye-witness accounts and the pilot's statements indicate the following:-

- i) The aircraft's engine was running rough and stopped in flight prior to impact.
- ii) The pilot has confirmed that the engine was running very rough and by gesture indicated that the vibration was severe.
- iii) The magneto (ignition) switch was set to the left hand magneto only. The pilot has no recollection of putting it there during his emergency situation.
- iv) The aircraft descended at a relatively steep angle into the fish pond.
- v) There was no shortage of fuel, samples taken from the aircraft and bulk source were satisfactory. All the engine and airframe fuel components (except the tanks) were completely immersed in water and it was not possible to determine if there was any previous contamination.
- vi) The basic engine was undamaged and a limited strip has not revealed any internal failures. There is some fairly positive evidence that the engine was stationary or brought to rest very quickly at impact. This perhaps bears out that the engine had stopped or at the most was windmilling.

All but two of the sparking plugs were contaminated by mud and water or oil. There was no obvious evidence that they were fouled or unserviceable during the final flight.

No investigation of the magnetos or fuel injection components has been carried out.

- vii) Two of the three propeller blades were bent rearwards indicative of the propeller being stationary on impact. However, one of the damaged blades had lost its tip (some 3½ inches) the fracture indicating a combination of bending/shear. The blade at the fracture point was bent sharply forwards. This feature does suggest a conflict of evidence with alternate explanations:-

- A) If the engine was stopped it has only just done so and hence was probably windmilling.

Due to the low energy it would have been brought to rest quickly which could explain two bent blades with the third being absolutely undamaged. It seems reasonable to assume that this third blade never impacted anything during this final flight.

It is difficult to see that this low energy impact would have sheared-off the propeller tip.

- b) If the engine was in fact still delivering power on impact the blade tip could have been sheared-off by initial impact with the bottom of the pond which together with the subsequent impact of the second blade brought the engine abruptly to a halt. All rotation then ceased leaving the third blade undamaged.

This may pre-suppose two things:-

- i) That the engine was delivering significant power. This conflicts with eye-witness accounts.
- ii) ii) that either the bottom of the pond or an object in the pond was hard enough to react the considerable force required to break-off the tip. The pond bottom is quite soft and no substantial hard object has been found. However, no concerted search has been made.

- c) The propeller tip could have been lost in flight due to a fatigue failure. This is not an uncommon occurrence particular if the propeller surfaces are not kept in first class condition.

Opinion is divided as to whether the fracture suggests fatigue evidence but expert opinion from UK is inclined to discount this due to the significant amount of bending. It is felt that the centrifugal force dominates and bending would be minimal as final failure occurred. The fracture face has been sent to UK AIB for expert examination.

- d) The tip could have struck something during the take-off run or in flight.

Transavia data quotes the minimum propeller ground clearance as 1 foot. It is presumed that this is with the oleo compressed and a depressed tyre. This is a generous clearance and taken with the layout of the PL12 it seems unlikely that impact could have occurred on the ground run.

The possibility of the propeller striking something in flight is remote but possible. An isolated object such as a post could clear the aircraft but still be struck by the plower arc of the propeller.

It has been questioned whether such ground or flight impact could affect only one blade. The answer is probably yes if the object was relatively small, such as a post, and the aircraft forward speed was reasonably high. It is a question which raises some doubts over this possibility.

In the case of c) and d) it is possible that the resulting vibration would be severe and if the engine did not itself stop it could cause the pilot to try things which could contribute to it stopping, e.g. pumping the throttle or selecting individual magnetos.

Summarising the situation so far, expert opinion on the propeller blade fracture may pin-point a cause or help eliminate some probabilities.

We can dismiss somethings which we know did not stop the engine.

We cannot eliminate others unless certain engine components are stripped, investigated and possibly rig tested with the help of an experienced overhauler. Unfortunately no such organisation exists in Malaysia.

If such investigations proved negative we would be no nearer to finding the cause of the accident.

ANALYSIS 9M-PIC

The accident occurred simply because the engine stopped. There is no reason to believe anything else contributed directly to the cause of the accident.

Why did the engine stop:-

- 1) FUEL
 - a) No fuel (quantity) - Adequate fuel
 - b) Wrong fuel - Correct type
 - c) Fuel turned-off - ON at impact
 - d) Contaminated fuel - A/C tanks and bulk OK
 - e) Blocked or disconnected fuel line - Not determined
 - f) Engine fuel system components faulty - Not investigated internally
 - g) Tank vents blocked - Not determined.
 - h) Carburettor icing - Highly unlikely.
 - i) Blocked air intake - Not determined.
 - j) T/O with hot air selected - Not applicable
 - k) Fuel pump ON/OFF - Not known
 - l) Emergency fuel shut-off - Not known

- 2) IGNITION
 - a) Faulty magnetos - Not investigated
 - b) Faulty ignition switch or circuits (LT) - Not investigated
 - c) Faulty plugs - Unlikely to affect both banks
 - d) Faulted plugs - Not evident, inconclusive
 - e) Faulty harnesses (HT) - Not evident.
 - f) Magnetos not being driven - Drive intact

- 3) ENGINE
 - a) Major internal failure - No
 - b) Broken accessory drives - No
 - c) Camshaft not being driven - Driven
 - d) Valve gear problems - No

- 4) PROPELLER
 - a) Structural failure - Tip missing one blade
 - b) Loss of pitch control - Not determined
 - c) Inadvertent feathering - Not determined
 - d) Loss of oil pressure/CSU failure - Not determined

- 5) PILOT ACTIONS
 - a) Fuel not on for take-off - ON at impact
 - b) Selected only one magneto - One at impact
 - c) Mishandled engine, inc. -
 - i) Wrong mixture - RICH At impact
 - ii) Hot/Cold air selection - N/A
 - iii) Abrupt throttle handing - Engine fairly tolerant

 - d) Incorrect response to engine problem

- | | | | |
|------|----------------------|---|----------------|
| i) | Electric pump on | - | Not known |
| ii) | Select one fuel tank | - | BOTH at impact |
| iii) | Full rich | - | RICH at impact |

* All fuel components except tanks immersed in water.