DEPARTMENT OF CIVIL AVIATION MALAYSIA

AIRCRAFT ACCIDENT

AG-CAT 9M-AWR

OPERATOR : WIRA KRIS AGRICULTURE SERVICES

AIRCRAFT : TYPE :GRUMMAN AG-CAT

NATIONALITY : MALAYSIAN

REGISTRATION: 9M-AWR

PLACE OF ACCIDENT : PASOH 4

DATE AND TIME OF ACCIDENT : 9TH. OCTOBER 1980
AT ABOUT 1448 HRS.

ALL TIMES IN THIS REPORT ARE LOCAL (+ 8 HOURS GMT)

SYNOPSIS

The office of Aircraft Accident Investigation was notified of the accident on 9th. October 1980.

Investigation of the accident commenced on the following day by the Chief Inspector of Aircraft Accidents, Ministry of Transport Malaysia and assisted by personnel from the Department of Civil Aviation Malaysia.

1. Factual Information

1.1 History of flight

On 9th. October 1980, the pilot of 9M-AWR was assigned to conduct a series of agricultural spraying flights, operating from Pasoh 4 airstrip in Negeri Sembilan. The pilot took off at 1130 hrs and the flight progressed without encountering any incident. At 1320 hrs the pilot stopped for refuelling. He resumed his flight at 1340 hrs but was interrupted at 1410 hrs when the hopper door was found to be unserviceable. This interruption lasted for 25 minutes and the pilot took off at 1435 hrs.

Prior to landing at approximately 1440 hrs the pilot decided to practise slow speed handling at low level. On completion of the air excercise and when opening up power, the pilot reported experiencing engine backfiring, partial loss of power and slight vibration. As he was close to the ground approximately 300 feet above ground level, the pilot immediately decided to force land the aircraft on the nearest opened field.

The aircraft landed way in on the field which was about 800 feet long. On passing 2/3 of the field lengths the pilot decided to brake hard as he was fast approaching the end of the field. As a result, the aircraft skidded to the right and somersaulted, inflicting substantial damage particularly to the airframe of the aircraft. The pilot escaped from the wreckage unhurt.

1.2 Injuries to person

Nil

1.3 Damage to Aircraft

The aircraft was lying inverted approximately at the two-third point of the field along the landing direction. Apart from the lower wing, engine and

undercarriage, the other parts of the aircraft were substantially damaged. The fuel system was intact but due to the aircraft lying inverted most of the fuel on board was presumed to have drained out through the vent system. The propeller control lever was at increase i.e fine pitch but not at the full range of its travel. The throttle lever appeared to be approximately 1/2 open and the mixture lever was well towards rich but again did not appear to be at the end of its travel. The propeller was badly damaged, each blade being bent backwards at about mid-span. The bent blades indicated that the propeller was either stationary or turning very slowly and delivering little or no power on impact.

1.4 Aircraft Informations

Valid Certificate of Airworthiness No. M293

Valid for aerial work cat until 18th. Sept 1981.

Valid C of M until 20th. October 1980.

1.5 Other Damage

Nil

1.6 Pilot Experience

Total hrs flown	3000 hrs
Total hrs on type	700 hrs
Total hrs last 30 days	65 hrs

1.7 Meteorological information

The weather at the time of the accident was good.

1.8 Test & Research

1.8.1 Fuel Filter

The fuel filter was removed as a complete assembly from the aircraft. Due to the inverted position of the aircraft, the fuel filter was found dry at the time of removal.

The filter was a simple fine wire gauze specifically designed such that quite large volumes of water or dirt could accumulate in the filter bowl before there would be any risk of contamination flowing into the engine except under sustained negative `g' or prolonged inverted flying.

There was a very small quantity of fine grit trapped in the top of the filter bowl (between the filter element and the recess into which it locates) and the internal cone of the filter itself. This suggested that at the time the aircraft was inverted, dirt accumulations at the bottom of the filter bowl fell to the top (now the bottom).

The filter bottom cap, filter bowl and filter all showed signs of slight staining which could be in.idicative of water accumulation. The filter cap in particular had indications that corrosive products or dirt had been lightly scraped off, probably during routine maintenance.

The bottom spigot of the filter element where it frets on the cap had lost its protective plating and was rusty.

It was not possible to estimate how much water may have been present, or when, but available evidence did not suggest a large amount. The filter design was such that for normal flying even relatively large quantities would not be hazardous.

1.8.2 Magneto Switch

The magneto switch and sub-panel were removed to enable checks to be made on the switch.

Continuity checks across the contacts at each switch position were made together with insulation resistance checks. Results were satisfactory and the general condition of the switch, its feel, and operation seemed satisfactory.

1.8.3 Engine Test

Superficial on site investigation carried out did not reveal any obvious explanation for the loss of power avered by the pilot.

The engine was removed from 9M-AWR and fitted on another aircraft namely 9M-AWK for test runs.

1st. Test Run

The engine was warmed up at 1,000 rpm for 10 minutes Magneto drop checks and take-off power checks were staisfactorily undertaken. All engine parameters were normal and progressive throttle opening did not lead to any anomalies.

With engine operating at 1,700 rpm, "slamming" the throttle to take-off power resulted in momentary backfiring accompanied by 3 puffs of black smoke. This was repeated on 3 occasions, all giving the same results.

2nd. Test Run

Following the 1st. test run, the engine oil filter was checked and no metal contamination was found. The oil filter was re-installed and an engine run was again undertaken. Despite five attempts at running the engine at 1,700 rpm and slamming the throttle open, the engine did not experience any backfiring or associated power loss.

3rd. Test Run

After the 2nd. engine run, the inlet air filter and the carburettor fuel filter were checked for possible contamination and those checks were satisfactory. Attempts to reproduce the backfiring symptoms were made on six occasions but the engine operated normally.

2. Analysis and Conclusion

2.1 Analysis

The engine did not have a history of backfiring particularly when slamming the throttle from idle to full power with propeller in full fine position and mixture in rich position.

Prior to the accident the pilot had been slow flying with throttle and RPM lever at low power setting. It was reported that slow flying was conducted for approximately 10 minutes. On application of power, evidences revealed that only the throttle was advanced forward whilst propeller lever was left untouched. This caused engine backfiring, loss of power and engine vibration.

Since the aircraft was low in altitude (300 feet) and with an open space available below him, the pilot did not think about recovering the engine but instead elected to close the throttle and committed himself to a forced landing.
The direction of landing was well chosen, but he overshot his intended touch down point and had to brake hard to avoid overshooting. This harsh braking caused the aircraft to skid to the right and nose over on to its back.

2.2 Finding

a) There was no failure or malfunction of the aircraft or any of its systems or components prior to the accident.

b) The aircraft was properly certificated and in airworthy condition.

c) The pilot was properly certificated to conduct the flight.

d) The pilot applied full power after a long slow flight without selecting the RPM lever to full fine pitch position which caused over boosting and backfiring.

e) The pilot did not have ample time and altitude to assess the actual situation but instead elected to force land the aircraft instantaneously.

f) The pilot overshot the intended landing point. His poor braking technique caused the aircraft to skid and tip over.

Probable Cause

The most probable cause of the accident was the failure of the pilot to apply proper braking technique during a forced landing following a partial loss of engine power.

Recommendation

It is recommended that procedures, pratices and training should be reviewed towards increasing crew efficiency and competency particularly in the handling of emergencies.

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