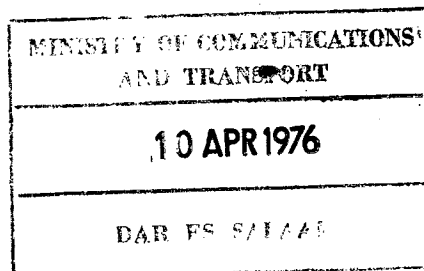


CAV/ACC/25/75

ACCIDENT INVESTIGATION BRANCH

CIVIL AIRCRAFT ACCIDENT

Report on the Accident to Cessna 182H
Aircraft Registration Number 5H-MMN
which occurred on the 29th August,
1975, at Football field Approx.
32 kilometers East of Songea,
Tanzania.



EAST AFRICAN COMMUNITY

ACCIDENT INVESTIGATION BRANCH

CIVIL ACCIDENT REPORT CAV/ACC/25/75

AIRCRAFT TYPE & REGISTRATION: CESSNA 182H, 5H-MMN
ENGINES: ONE CONTINENTAL O-470-R
OWNER: GOVERNMENT OF TANZANIA
OPERATOR: GOVERNMENT OF TANZANIA
PILOT: GEORGE MAZULA, UNINJURED
PASSENGERS: NIL
PLACE OF ACCIDENT: FOOTBALL FIELD APPROXIMATELY
32 KILOMETRES EAST OF SONGEA,
TANZANIA.
DATE & TIME: 29TH AUGUST, 1975,
AT 0755 HOURS.

ALL TIMES IN THIS REPORT ARE GMT

SUMMARY

The aircraft was on a government flight to Songea from Dar es Salaam. It carried one pilot and nil passengers. The pilot stated in his report that after approximately 2½ hours he noticed an abnormally high oil and cylinder head temperature indications with low oil pressure reading. He then decided to make an emergency landing on a football field nearby. As the aircraft touched down the pilot observed a group of school children running from a building towards the aircraft. He applied right rudder and increased power in an attempt to turn the aircraft away from the children. The aircraft became airborne for approximately 30 metres and then crashed into a building adjacent to the football field.

The aircraft was substantially damaged on hitting the building. The building suffered extensive damage - one of its brick walls was partly demolished by the force of the crash and the roof, covered with corrugated iron sheet, was ripped open in several places.

The pilot escaped without injuries. A woman, occupying the building at the time, was hit and seriously injured by the falling bricks.

Inspection of the engine, at the crash site, revealed that there was insufficient engine oil for normal operation. No mechanical defect has been found to account for the loss of engine oil during the flight.

The report concludes that the probable cause of the accident was loss of control during an emergency landing following abnormal rise in oil and cylinder head temperatures during the flight.

1. INVESTIGATIONS:

1.1. HISTORY OF THE FLIGHT

The aircraft took off from Dar-es-Salaam at 0508 hours on a government flight to Songea. According to the pilot, at approximately 0715 hours he noticed a rise in oil temperature gauge reading. Thirty minutes later, he observed that the oil and cylinder head temperature gauges indicated abnormally high figures and the oil pressure reading was low. He reduced power, but apparently the high temperature readings persisted. He then decided to make an emergency landing at a football field nearby.

The aircraft touched down at the edge of the field with plenty of open space in front of it. Soon after touch down, the pilot noticed a group of school children running, from a building, towards the aircraft. He applied right rudder and increased power in order to turn the aircraft away from the children. The aircraft became airborne for approximately 30 metres, then bounced, and finally crashed into a building approximately 150 metres from the initial touch down point. The pilot climbed out of the wreckage uninjured.

1.2. INJURIES TO PERSONS

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Others</u>
Fatal	-	-	-
Non-fatal	-	-	1
None	1	-	-

1.3. DAMAGE TO AIRCRAFT

The aircraft was substantially damaged on hitting the building. The entire fuselage was crumpled particularly along the underside. Both mainplanes were broken. The propeller blades were severely bent.

1.4. OTHER DAMAGE

A building adjacent to the football field was hit and extensively damaged during the crash. The force of the impact tore open a large hole into one of the brick walls of the building. The corrugated sheets, covering the roof, were ripped open at several places. A woman who was inside the building at the time, sustained serious injuries when she was hit by the falling bricks.

1.5. CREW INFORMATION

The pilot, George Mazula, aged 26, holds an East African Private Pilot's Licence No.X-30 issued on 5th February, 1973, and valid till 1st July, 1976. This licence entitles him to fly Group 'A' landplanes i.e. all single - engined aeroplanes of which the maximum total weight authorized does not exceed 12,500lbs. He also holds a Flight Radio Telephony Operator's Licence bearing the same number X-30 as his pilot's licence.

EXPERIENCE:

At the time of accident, the pilot had acquired a total of 555 hours flying experience with 499 hours as pilot in command. He claimed 400 hours flying experience on Cessna 182 type aircraft.

1.6. AIRCRAFT INFORMATION:

5H-MMN a Cessna 182H Serial No.182-56229, powered by one Continental O-470-R engine, was manufactured by Cessna Aircraft Company, Wichita Kansas, U.S.A., in 1965. The aircraft arrived in East Africa in possession of FAA Export Certificate of Airworthiness No.E-61859 dated 7th April, 1965. On arrival an East African Certificate of Airworthiness No.T77 was granted on 30th June, 1965, to expire on 29th June, 1966. The Certificate of Airworthiness has since been kept current and it was valid at the time of the accident..

MAINTENANCE HISTORY

The aircraft was maintained by Tanzanian Air Services Limited to their Approved Maintenance Schedule reference TAS/CPLA/ISSUE 1. At the last renewal of the Certificate of Airworthiness a Check III inspection was completed, in accordance with this schedule, on the 23rd July, 1975. All maintenance required by this Schedule was up-to-date.

The engine a Continental O-470-R Serial No.130972-4-R was completely overhauled on 5th May, 1972, after 1246.35 hours in service. On 31st May, 1972, it was installed to Cessna 182H, 5H-MMN. After only 58.40 hours in service, the engine had top overhaul due to overheating and lack of power. On 28th June, 1973, it was installed to Cessna 182N, 5H-MOL, at 340 hours since overhaul. Available records show that the engine was lying idle and not operated from 24th January, 1974 to 17th July, 1975 when it was re-installed to Cessna 182H, 5H-MNN at 540.40 hours since overhaul. The engine has since then been in service for 45.45 hours when the accident occurred.

At the time of the accident the following hours had been recorded:

Airframe	total	hours	since	manufature	3063.55
"	"	"	"	last Check III	44.15
Engine	"	"	"	complete overhaul	586.25
Propeller	"	"	"	Overhaul	659.

1.7. METEROROLOGICAL INFORMATION

There was no specific forecast for the site of the accident. The flight was conducted under VFR conditions and the weather condition were fully VMC.

1.8. AIRDS TO NAVIGATION

Not applicable.

1.9. COMMUNICATIONS

The pilot claimed that from approximately 1.10 hours after take-off to the time of the accident, he tried unsuccessfully to establish radio contact with East Air Centre and Songea Station.

1.10. AERODROME & GROUND FACILITIES

Not applicable.

1.11. FLIGHT RECORDER

Not fitted and none required.

1.12.1. WRECKAGE

The aircraft crashed into a brick wall of a building, resulting in substantial structural damage to the fuselage, the mainplanes and the undercarriage. The aircraft came to rest in a nose down position supported by a propeller blade at the front and tilted to the starboard mainplane. Both propeller blades were severely bent. The nose section was all crumpled and the nose landing gear broken. The engine mounting frame was sheared at several places. The windshield was completely shattered. Both mainplanes were extensively damaged. The starboard mainplane was broken and its outer portion was lying flat on the ground. The port mainplane was dented and wrinkled with the flap partly torn off. Both wing struts were broken. The fuselage was severely crumpled. The port horizontal stabilizer and the elevator were badly twisted. The control cables had snapped during the crash.

1.12.2. TESTS & RESEARCH

The engine was visually inspected, at the crash site, four days after the accident. It was observed that the oil 'dipstick' reading was less than 6 quarts. There were no signs of oil leakage underneath the engine. In section V of the Owner's Manual, it is advised not to operate the aircraft on less than 9 quarts of engine oil. It is further advised that in order to avoid loss of oil through breather, the oil should be filled to 10 quarts level for normal flights of less than 3 hours and to 12 quart level for extended flights. The flight in question was estimated to last 2 hours and 50 minutes and the pilot claimed the oil level to be at the 10 quart mark prior to take-off.

The engine was later taken to an engine shop for detailed inspection. A crankshaft run-out check at the propeller flange gave a reading of 0.009 inches - exceeding the allowable serviceable limit of 0.005 inches. And as a result the engine was not subjected to performance tests on a test bed. Instead it was completely dismantled for inspection in accordance with the manufacturer's instructions. Visual inspection carried out indicated general serviceability with no internal failure.

There were positive indications of oil consumption, but it was not possible to estimate the rate of consumption during the material flight. Cylinder walls were found to be scuffed and there was evidence of overheating.

In his report the pilot indicated that he was aware before the flight, that the aircraft had, on previous occasions, developed engine-oil problems.

Another pilot, who flew the aircraft on several occasions prior to the accident, testified that the oil consumption was sometimes high. During a period of 31 days preceding the accident the same pilot made 3 log book entries related to engine oil problems. On 23rd August, 1975, he complained about high oil temperature on climb and a slow oil leak from the front of firewall. These defects appear to have been rectified and on 28th August, 1975, the aircraft flew a total of 4 hours and 20 minutes apparently without further oil related problems. The following day, however, the aircraft suffered the accident while on a flight to Songea.

1.13. FIRE

There was no fire,

1.14. SURVIVAL ASPECTS:

The pilot survived the accident without injuries.

1.15. MEDICAL ASPECTS

Not relevant to this accident.

2. ANALYSIS AND CONCLUSIONS

2.1. ANALYSIS

The aircraft had been flying for approximately 2½ hours when the engine is reported to have developed high oil and cylinder head temperatures accompanied by low oil pressure. Such indications would normally show if an engine runs out of sufficient oil for its operations.

When the engine was examined at the crash site, after the accident, the oil level was found to be at the 6 quart mark - well below the minimum recommended operating level of 9 quarts. Six days earlier the same aircraft was reported to have experienced high engine oil temperature on climb and a slow oil leak from the front of the firewall. Although these defects appear to have been rectified and the aircraft flown, on 28th August, 1975, without incident, the following day, 29th August, 1975, the aircraft again ran into apparently similar engine oil problems that led to the accident.

Inspection of the engine after the accident revealed some signs for engine oil consumption. This, in addition to recent complaints about the oil system, suggests that the engine oil system was experiencing some problems.

Maintenance records show that after the engine was completely overhauled, it was in service for only 58.40 hours before it had top overhaul due to overheating and lack of power. Such a short interval between overhauls raises questions about not only the condition of the engine after it was completely overhauled, but also the operating procedure applied to the aircraft. Engine overheating could for instance have resulted through use of overlean mixture during flight.

It should be noted that the engine was not in service for a period of approximately 18 months ending on 17th July, 1975. The accident occurred approximately 48 hours after the engine was returned to service.

It appears, therefore, that the aircraft was subjected to unscrupulous maintenance and operational practices that gradually led to high engine oil consumption. Consequently the rate of engine oil consumption, during the material flight, was probably sufficiently high to have reduced the oil quantity below the minimum operating level - leading to the reported abnormally high oil and cylinder head temperatures and low oil pressure.

It may also be well to consider the possibility that during the pre-flight check, the engine oil level was not read accurately. In that case, the aircraft may have taken off with less than 10 quarts of engine oil - i.e. below the level normally recommended for such a flight. This again would, during the flight lead to lack of sufficient oil for engine operation.

2.1.2. LOADING

The gross weight and Centre of Gravity were within the prescribed limits at the time of the accident. The fuel tanks were, at the time, approximately one-quarter full. The pilot, the only person aboard, carried no luggage.

2.2. CONCLUSIONS

(a) Findings

- (i) The documentation of the aircraft was in order.
- (ii) The pilot was properly licenced.
- (iii) The aircraft was properly loaded and its centre of gravity was within the prescribed limits.
- (iv) The aircraft had been in the air for approximately 2 hours and 50 minutes when the accident occurred.

- (v) The accident occurred during an emergency landing at a football field.
- (vi) The amount of engine oil present after the accident was less than the minimum quantity required for normal engine operation.
- (vii) The engine had a history of defects associated with high oil and cylinder temperatures and high oil consumption. There appears to be evidence of unsatisfactory inspection and monitoring of the condition of the engine and operating procedures.

(b) CAUSE

The probable cause of the accident was loss of control during emergency landing on a football field after the engine had developed abnormally high oil and cylinder head temperatures.

K.R. Grant

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FOR CHIEF INSPECTOR OF ACCIDENTS