FEDERAL REPUBLIC OF NIGERIA

CIVIL AIRCRAFT ACCIDENT REPORT ON ALOUETTE II S. A. 3180 NEAR WARRI AERODROME on 12th JULY, 1976

FEDERAL MINISTRY OF INFORMATION
PRINTING DIVISION, LAGOS

CIVIL AIRCRAFT ACCIDENT REPORT ON ALOUETTE II S. A. 3180 NEAR WARRI AERODROME

Federal Ministry of Civil Aviation,
Air Registration Branch, Mortals
Mohammed Airport, P.M.B.
1029, Ikeja.

Ref. No. CAD. 52/9/77171
20th September, 1977.

The Honourable Commissioner for Civil Aviation,
Federal Ministry of Civil Aviation,
Lagos.

Sir,

I have the honour to submit the Report by Mr K. K. O. Sagoe, an Inspector of Accidents, on the circumstances of the accident to Alouette 11 SN-AHO which occurred in a forest about 1.6 kilometres west of Warri Aerodrome on 12th July, 1976.

I have the honour to be, Sir,

Yours Sincerely,

M. M. A. AGBABIAKA, *Chief Inspector of Accidents*

CIVIL AIRCRAFT ACCIDENT REPORT

Aircraft.-S.A. 3180 Alouette 11 Serial No 1985.

Engine.-Turbomeca Astazou IIA Serial No. 853.

Registered owner.-National Electric Power Authority (Niger Dams Authority), P.M.B. 12605, Lagos.

Crew.-Captain Zsolt Baturfi, c/o Aero Contractors (Nig.) Limited, Ikeja-Injured. Passenger:

Mr Ogbeni, Manager, N.E.P.A.-Injured.

Place of Accident.-About 19 km. from Warri Airfield. Co-ordinates of the wreckage site were approximately 05.25N, 05.55E, on a bearing of 135, from the Warri "EW" NDB at an elevation of 36.6 metres above mean sea level. This is about 1.6 km. west of Umolo villaga in Utorugu (Warri), Bendel State. Ward airstrip is a private aerodrome owned and operated by Aero Contractors (Nigeria) Limited.

Date and Time.-12th of July, 1976 at 1402.*

Summary.-The Alouette 11 helicopter registration 5N-AHO was on private flight from Port Harcourt to Lagos with a proposed re-fuelling stop at Warri. About 12 nautical miles from Warri aerodrome the helicopter developed a left spin about its vertical axis which eventually ended in a crash into a thick vegetation 213.4 m. below.

I . INVESTIGATION

I.I. HISTORY OF THE FLIGHT

The helicopter was operating a non-scheduled flight from Port Harcourt to Lagos with a proposed re-fuelling stop at Ward. The estimated time of departure from Port Harcourt was 1305 local time, flying on visual flight rules in clear weather. The Captain, Zsolt Batorfi gave his estimated time of arrival in Warri as 1405. The last contact with Port Harcourt was at 1319 when the helicopter reported at the Control Zone Boundary-20 Nautical Miles.

Contact was made with the Warri Aero Contractors Radio Room at 1359.

The Pilot was making a descent from 34.8m approximately 10 minutes out from Warri when he heard a metallic sound and the helicopter immediately spun violently to the left losing height. The pilot made a frantic attempt to reduce the rate of fall by increasing the collective pitch of the main rotor blades.

The helicopter crashed in daylight at 1402.

1.2 METEOROLOGICAL INFORMATION

There was no established weather station at Warri aerodrome. A system of visual reporting was adopted by the airstrip operator. The estimated meteorological information was

Wind	.. Gusty
Visibility	. . 4 Kilometres or less
Weather	.. Rain
Temperature	.. 28°C.

1.3 INJURIES TO PERSONS

Injuries	Crew	Passengers	Others
Fatal			
Non-fatal	1	1	None

All times in this report are local.

1.4 DAMAGE TO AIRCRAFT

The helicopter was totally destroyed. The centre frame was crushed and the tail boom was broken in several places beyond any form of repair. The engine too was damaged.

1.5. CREW INFORMATION

Captain Zsolt Batorfi held a current Nigerian Commercial Pilot's Licence No. 1132 (H) which was transferred from his original C.P.L. (H) No. 69.05 first issued on the 6th of June, 1969 by the Kingdom of the Netherlands. He was born on the 18th of June, 1948 at Szeged, Hungary. He successfully completed his Pilot Medical Examinations on the 8th of June, 1976 after which his licence was renewed from the 8th of June, 1976 to the 13th of December, 1976. He held the following type ratings :

Alouette II	. . .PI (i.e. Captain in Command)
Alouette III	.. . PI

He had no Instrument Rating.

His flying experience in the last six months previous to his licence renewal was

Pilot-in-charge .. .. 131.15 hours.

	PI (Hours)	P2 (Hours)
Day	353	45.35
Night		4.20
Totals	353.45	45.55

The Captain flew about 9 hours during the 3 days period preceding the accident. He was normally in the employment of Aero Contractors (Nig.) Limited which operated the helicopter for N.E.P.A.

1.6. AIRCRAFT INFORMATION

The helicopter was an Alouette Astazou SA. 3180 Serial Number 1985, registered in Nigeria as 5N-AHO. It was constructed in January 1968 by Son AVIATION, FRANCE and had flown 2007 hours since new. The Certificate of Airworthiness was renewed on the 23rd of March, 1976 and valid until the 22nd March, 1977. The weight and centre of gravity of the helicopter were within the prescribed limits at the time of take-off and at the point of crash. It was last weighed on the 28th of June, 1976. A Turbomeca Astazou IIA engine Serial No. 853 was installed with total time run since last complete overhaul of 464 hours 30 minutes and a total time run since new of 1000 hours 30 minutes. All appropriate Airworthiness Directives had been complied with.

The helicopter was first registered by the Western State Government, Ibadan on the 25th of March, 1968. This was cancelled on the 28th of March, 1973 when ownership was transferred to the National Electricity Power Authority which re-registered the helicopter again on the 10th
of April, 1973. The first issue of a Private Category Certificate of Airworthiness was on the 28th of March, 1968, but the category was later changed to "Public Transport" on the 30th of June, 1970 by its first owner.

The helicopter was assembled in Lagos and had since been maintained for its owners by the Aero Contractors (Nig.) Limited.

1.7 AIDS TO NAVIGATION

The Warri NDB on 250 KHZ and the aircraft ADF were serviceable at the time of crash. The helicopter was equipped with a V.H.F. and an H.F. transreceiver and a gyro-compass.

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1.8 COMMUNICATIONS

The Radio Station Licence No. 034/AC/76 was valid till the 31st of December, 1976. Aero Contractors maintained a Flight Information Service at Warri on V.H.F. 131.7 M.H.Z. and H.F. 5695 K.H.Z. The Helicopter contacted Warri on V.H.F. 131.7 at 1359 and reported abeam Ughelli with an E.T.A. Warri as 1410. The following was also transmitted "Passing through a stormy weather, operations normal". He failed to call again 5 minutes out to landing i.e. 8 kitometres out in accordance with Aero Contractors local Flight Procedure. Warri Radio alerted Port Harcourt at 1410.

1.9 SEARCH AND RESCUE

A search commenced from Warri in another helicopter 5N-AKD at 1430. The rescue party concentrated around the Ughelli area. As 5N-AKD was approaching the crash area, Captain Batorfi by then had positioned the E.L.T. which he activated from the highest position possible. He succeeded in getting two pen light flares. 5N-AKD reported sighting the wreckage

at 1532. By 1540 the Rescue Party was air-borne with the injured pilot and passenger for Eku hospital. Arrival time at the hospital was 1600.

1.10 WITNESSES

No eye-witnesses.

1.12 OBSERVATIONS IN THE COCKPIT AFTER CRASH

Fuel shut off lever wire-locked in the 'ON' position.

Generator ..	OFF.
Battery	OFF.
Booster pump ..	OFF
Communications	131.7 (on Warri Frequency).
ADF	138.7 Switched off.
Fire extinguisher	Discharged with Impact.
Gyro-Compass ..	Stuck on 322 degrees.
Q.F.E.	Set at 1013.5 with altimeter reading 900 ft.
Air Speed Indicator	Stuck on 140 knots.

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1.14. TESTS AND RESEARCH

The following components were shipped to the National Aerospace Laboratory, NLR, the Netherlands.

1. The tail rotor gear-box with the damaged tail rotor blades and the tail end of the

3. Splined Coupling-(Gear-box end of transmission). A complete failure analysis was carried out on these components until a conclusive evidence was pin-pointed as the possible primary cause of the accident.

2. ANALYSIS AND CONCLUSIONS

2.1. Analysis

The circumstances of the aircraft's departure from Port Harcourt and the enroute phase of the flight at crusing altitude were routine. The slight detour abeam Utorugu was considered standard manoeuvre in view of the prevailing weather conditions.

Approximately ten minutes out from Warri, the Pilot heard a metallic sound after which the helicopter immediately spun violently to the left and finally crashed 213.4m to the woods. The pilot made a frantic attempt to reduce the rate of fall by increasing the collective pitch of the main rotor blades. This procedure could have increased the rate of spin further and probably just marginally reduced the rate of fall.

From the wreckage six equally probable causes of the accident were discovered. These were :

1. Failure of the tail rotor control cables.
2. Failure of the tail rotor blade flapping stop.
3. Failure of the drive shaft just aft of the front coupling. 4.

Internal failure of the tail rotor gear-box.

5. Failure of one of the drive shaft bearings.

A detailed laboratory investigation was carried out. The findings at the National Aerospace Laboratory of the Netherlands revealed that the probable cause of the tail rotor malfunction was the failure of the tail rotor gear-box input coupling. This resulted from excessive fretting wear on the splines on the input drive shaft and the internal splines of the coupling ring.

The time since overhaul of the tail-rotor gear-box at the time of crash was 1315.5 hours.

2.2. CONCLUSIONS (a) *Findings*

1. The helicopter had a valid certificate of airworthiness.
2. The helicopter was well maintained at all times before the accident.
3. The Pilot of the helicopter was qualified to be in command.
4. The flight was conducted in accordance with the approved flight manual.
5. All laws and Regulations were observed in the operation of the helicopter.
6. The search and rescue operations were conducted to commendable standards.

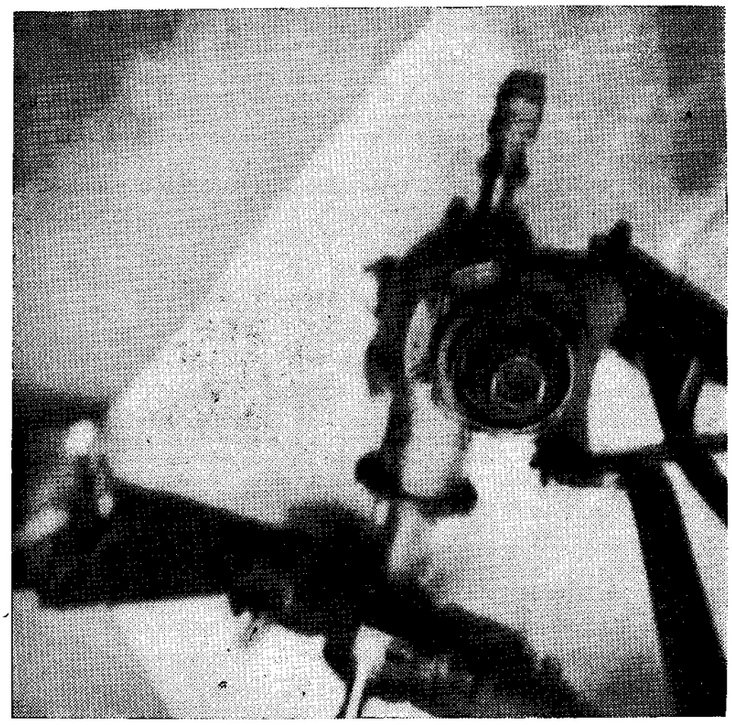
(*b*) *Cause*

7. The helicopter crashed due to mechanical failure.

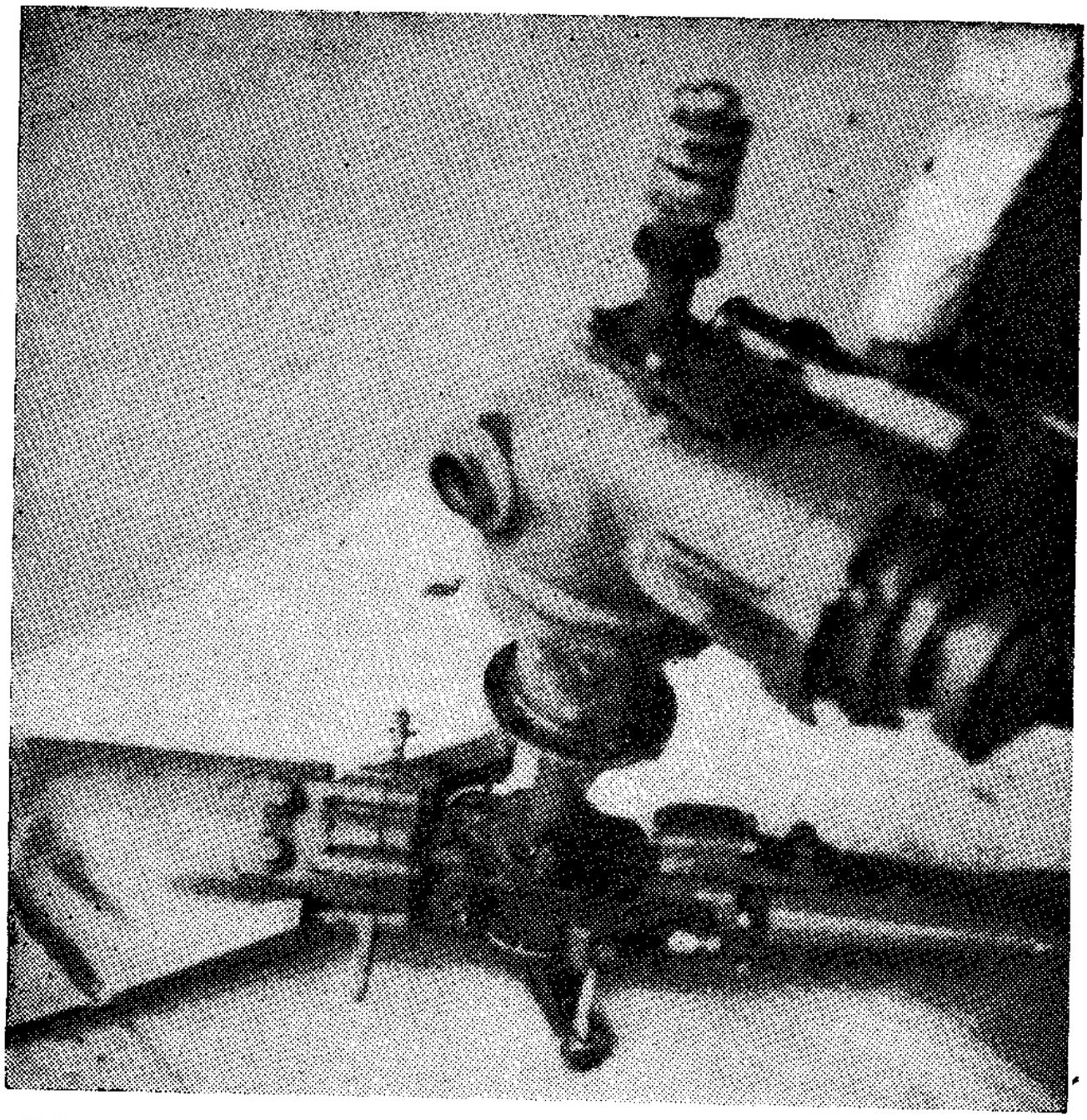
2.3. RECOMMENDATION

The time between overhaul of the tail-rotor gear-box should be limited to 1200 hours until strip reports could justify the 1500 hour time between overhaul which is now permitted.

K. K. O. SAGOE,
Inspector of Accidents



View of the ring-gear (which probably failed)



Tail-rotor gear-box showing position of the ring gear relative to the tail-rotor float stops

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Crash scene showing the wreckage