



FINAL REPORT

**INCIDENT OF EXPO AVIATION FLIGHT EXV 711
F-27, REGISTRATION 4R-MRA
ON 21ST FEBRUARY 2008
AT COLOMBO AIRPORT, RATMALANA – SRI LANKA**

Released by the Director General of Civil Aviation Sri Lanka

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**LIST OF ABBREVIATIONS**

AGB	-	Accessory Gear Box
AMO	-	Approved Maintenance Organization
ATC	-	Air Traffic Controller
CAA	-	Civil Aviation Authority
CPL	-	Commercial Pilot License
DGAC	-	Directorate General of Air Communication - Indonesia
DGCA	-	Director General of Civil Aviation - Sri Lanka
F/O	-	First Officer
PIC	-	Pilot in Command
UTC	-	Universal Time Constant
LH	-	Left Hand

**AIRCRAFT INCIDENT REPORT****SYNOPSIS:**

Operator and Owner : Expo Aviation (Pvt) Ltd
No: 466, Galle Road,
Colombo 03

Aircraft Make, Model : F 27 Mark 500 RF

Aircraft Nationality : 4R (Sri Lanka)

Aircraft Registration : MRA

Place of incident : at 200ft on take off from Colombo Airport
Ratmalana

Date and Time : 21st February 2008 at 0215 UTC
(0745 Hrs local time)

The Expo Aviation flight EXV711 which departed Colombo Airport, Ratmalana on a domestic passenger flight to Palali Airport , Jaffna had an engine fire warning at an altitude of 200 ft. on take off. The aircraft landed back at the departure airport.

The incident was notified to the Director General of Civil Aviation by the Operator through a telephone call followed by the incident report sent by fax. Accordingly, an investigation was initiated by an investigator appointed by the Director General of Civil Aviation. The aircraft was immediately inspected by CAA inspectors on the advice of the investigator.

The aircraft did not suffer serious damages. Accessory Gear Box Drive Shaft of No. 1 engine was observed damaged at the engine end. After the passengers and crew disembarked safely, the aircraft was parked in the parking apron after been subjected to an inspection.



1. FACTUAL INFORMATION:

1.1. History of Flight:

On 21st Feb 2008, at 0215UTC (0745 Hrs local times) Expo Aviation flight EXV 711, Fokker F27, registration 4R-MRA, returned, 15 minutes after takeoff due to an engine fire warning. Aircraft landed back safely with the feathered left engine at Colombo Airport, Ratmalana.

The aircraft operated as a scheduled domestic passenger flight, departing Colombo Airport, Ratmalana to Jaffna. It was a two crew operation and the pilot took off after being satisfied with the technical performance of the aircraft. At an altitude of 200 feet on take off fire warning bell & light started illuminating. F/O took immediate action and subsequently silenced them after realising the problem. On the instruction of the Pilot-in-Command, the F/O performed the fire drill in accordance with the emergency check list.

1.2. Injuries to Persons:

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Others</i>
Fatal	–	–	–
Serious	–	–	–
None	04	38	01

1.3. Damage to Aircraft:

The AGB Drive Shaft	- Bent, discoloured and sheared From the coupling flange
Coupling flange	- Sheared
Cover of the Coupling shaft universal joint	- Completely broken
Combustion Chamber No: 1	- Damage to expansion chamber and Outer air casing flange Dents and cracks outer air casing
AGB drive coupling (engine End)	- Excessive play
Coupling Shaft Cove air seal	- Fretting wear
Gear Wheel (Driven AGB drive)	- Teeth Damaged
Cover Assembly (gear box end)	- Completely damaged
Engine mount assembly	- Dent on one strut
Engine cowling assembly	- LH inboard burnt hole
Engine cowling assembly	- LH top two nos. of reinforce frame damaged
Bracket cable guide gearbox drip tray	- Damaged
Gear box drip tray	- Damaged hole
Fire sense element	- Discoloured and broken

1.4. Other Damages: None.

**1.5. Personnel Information:**

Pilot-In-Command : Capt. S. Boentoro, Male, 41 years

Licence : Valid Airline Transport Pilot License (No. 3566) issued by the DGAC Indonesia. Validated by DGCA Sri Lanka (CV/106/Capt/Expo)

Flying Experience : Total: PI 9725 hrs.
Total on type 6184 hrs as at 21.02.2008

Aircraft Ratings : PIC Fokker 27

Instrument Rating : Valid until 30.09.2008

First Officer : Mr. K.I. Sarathchandra

Licence : Valid Commercial Pilot License (CPL /A/440) issued by the DGCA Sri Lanka

Flying Experience : Total: 364 hrs.
Total on type 68 hrs as at 21.02.2008

Aircraft Ratings : PIC Cessna 152, F/O Fokker 27

Instrument Rating : Valid until 23.09.2008

1.6 Aircraft Information:

Type and Model : Fokker F27 Mark 500

Manufacturer's Serial Number : 10631

Date of Manufacture : 12-04-1982

Certificate of Registration : No.205, Registered in Sri Lanka Civil Aircraft Register

Certificate of Airworthiness : Valid till 3rd March 2008

Total Airframe Hours : 34537.37 hrs as at 21.06.2008

Total Cycles : 38101

Engines : Two Rolls Royce Dart 536-7 turbo prop

Propellers : Two Messier Dowty R 193/4-30-4/65

1.7 Meteorological Information: Reported wind was calm and visibility was 8-10 km

1.8 Aids to Navigation: Not applicable



- 1.9 Communication:** Voice communication between the Air Traffic Controller and the Pilot in Command had been in order.
- 1.10 Aerodrome Information:** Not applicable
- 1.11 Flight Recorders:** Data not considered essential to the investigation
- 1.12 Wreckage and Impact Information:** There was no impact of the aircraft on ground.
- 1.13 Medical and Pathological Information:** No fatalities or injuries caused to passengers and the crew
- 1.14 Fire:** The fire warning was in the air and the F/O carried out the fire drill in the air. The airport is of fire category 4.
- 1.15 Survival Aspect:** Not applicable.
- 1.16 Test and Research:** Not applicable for this incident
- 1.17 Additional Information:** Not Applicable.

2. ANALYSIS

- 2.1 General** - The Aircraft operated as a schedule passenger flight, from Colombo Airport Ratmalana to Jaffna. After the pre flight checks had been carried out, the aircraft was in a satisfactory condition to fly. The passengers boarded and engines were started, the aircraft was taxied to runway 04, got the clearance for departure and opened up power for take off. Still the performances were normal and everything was in a satisfactory condition. After aircraft got airborne and on the climb passing 200 feet No.1 engine fire warning indication and alarm activated in the cock - pit. As per the PIC's instruction the F/O carried out the fire drill and the pilot opted to return to base. The aircraft landed safely with the feathered Left Hand engine.
- 2.2 Drive Shaft** - At the inspection on ground it was observed that the AGB drive shaft of No. 1 engine had come out from the bearings of the universal joint assembly at the engine end. As a result of this, the shaft was rotating without coupling, hitting the combustion can No.1 causing impact damage on outer casing and expansion chamber. The flame tubes of combustion chambers have not suffered any impact damage. No evidence is there to reveal that the fire has come out from the damaged combustion can.
- 2.3 Engine Fire** - There is no evidence to state that the fire has occurred due to the fuel leak from the combustion can. Due to the air which had been used for cooling, which subsequently became hot, had come out from the combustion chamber No. 1 had been sensed by the fire warning system.



3. CONCLUSION

3.1 Findings:

- 3.1.1 The AGB Drive Shaft which had failed from its universal joint assembly was installed recently and had done only two flights / 4.58 hrs. since overhaul.
 - 3.1.2. The strip report of the overhaul of AGB drive shaft is unsatisfactory.
 - 3.1.3. The overhaul steps included in the strip report of AGB Drive Shaft shows a considerable deviations from the Dowry Rotol Overhaul Manual No. 83-10-9 for gear box drive.
 - 3.1.4 The essential parts like Rings (oil sealing between shoulder of bearing and open end of bearing cup) and bearing needle rollers have not been replaced at the overhaul of the AGB Drive Shaft.
 - 3.1.5 The cover of the coupling of AGB Drive shaft at engine end had broken as a result of this Drive shaft hitting on it. The broken pieces of this cover had become red hot due to hot air coming from the damaged combustion can had hit and punched the engine cowlings
- 3.2 **Probable Causes:** The probable cause is the AGB Drive Shaft shearing from the bearings of its universal joint at the engine end and loosening at the gear box end causing damage to the outer casings of combustion can No. 1, leaking hot air. This resulted in a loss of power and auto feathering.

4 SAFETY RECOMMENDATIONS:

- 4.1 AMO approval of the overhaul agency should not be renewed.
- 4.2 Inform the Expo Aviation to replace the AMO for their overhaul and repairs of components of F27 aircraft.
- 4.3 Until a satisfactory AMO is found, the parts have to be imported from reputed approved organizations.
- 4.4. All operators have to be informed not to procure and overhaul the spares from un approved Sources.

APPENDIX - 1 STATEMENT OF PILOT -IN- COMMAND

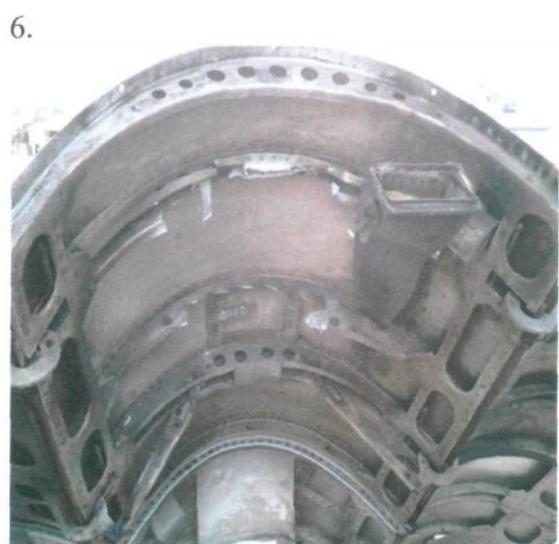
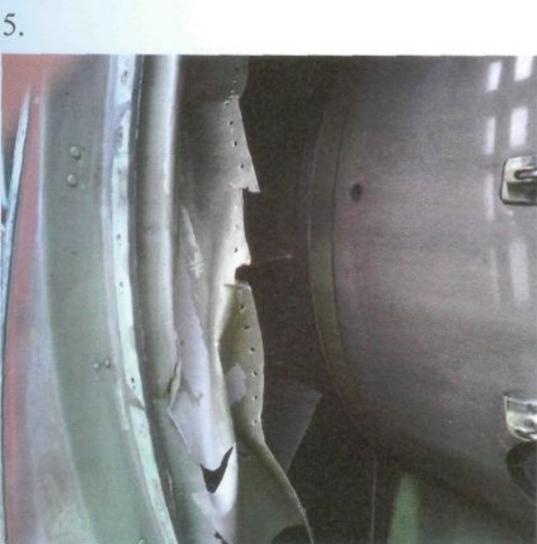
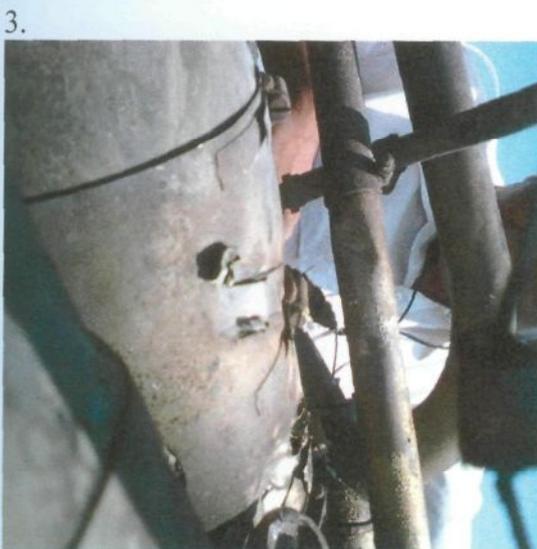
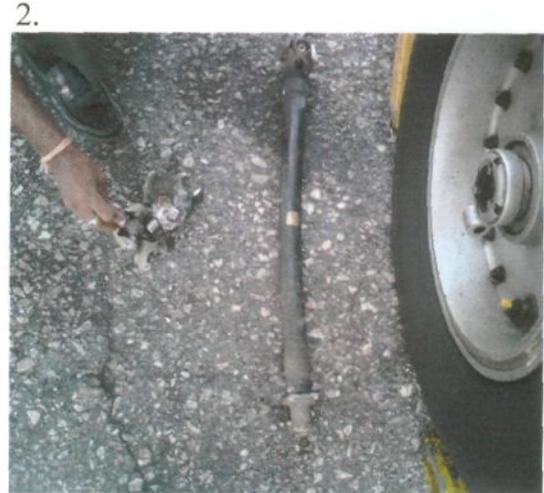
APPENDIX - 2 STATEMENT OF MAINTENANCE ENGINEER

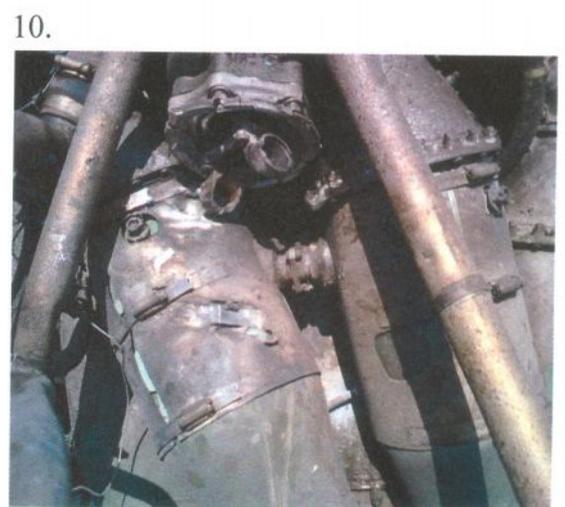
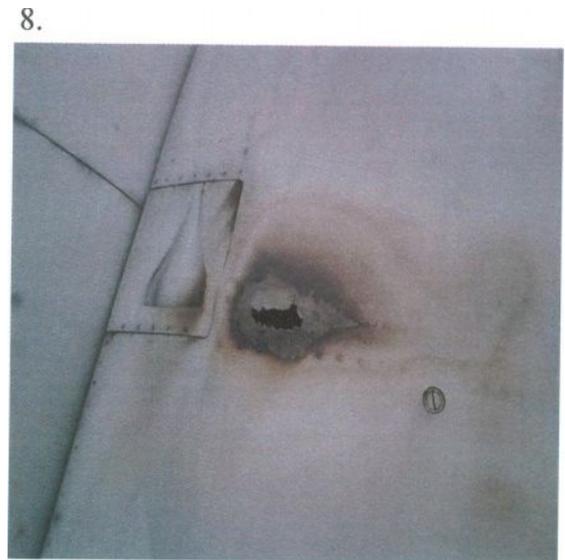
APPENDIX - 3 PICTURES OF THE DAMMAGED DRIVE SHAFT, ENGINE COWLINGS AND COMBUSTION CANS.

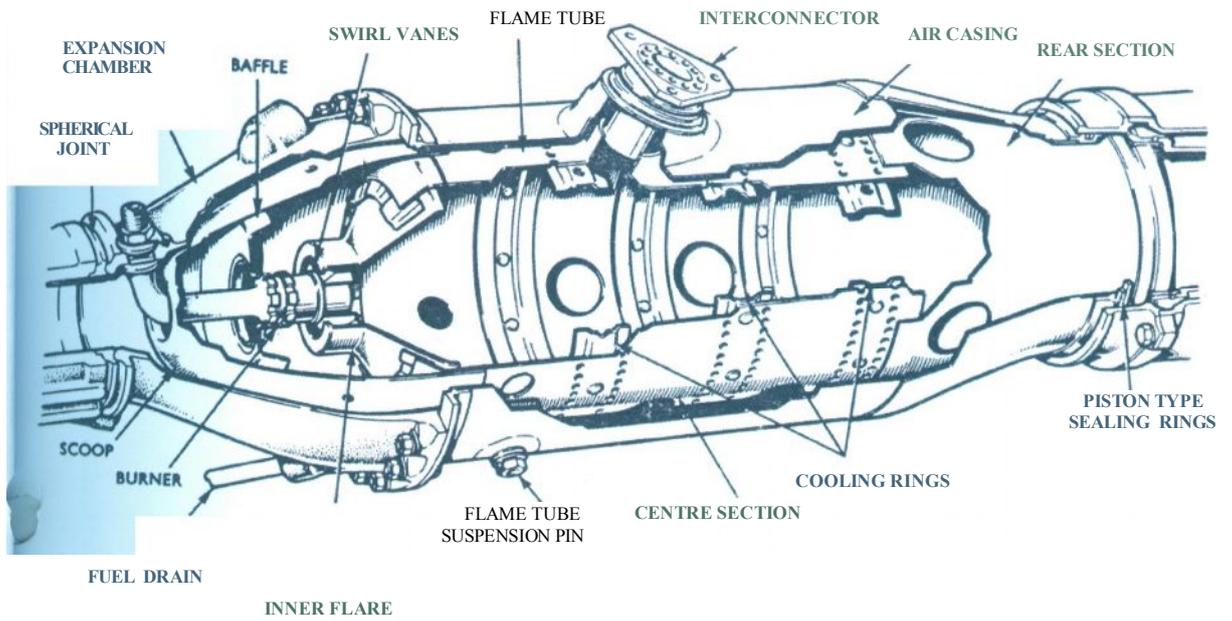
APPENDIX - 4 OVERHAUL STRIP REPORT OF THE AGB DRIVE SHAFT

Publication of Appendix 1 and 2 withheld in compliance with Chapter 5 Paragraph 5.12 of ICAO Annex 13 to the convention.

**APPENDIX - 3 - PHOTOGRAPHS TAKEN AT RATHMALANA ON 21ST
FEBRUARY 2008
FIRE ON NO. 1 ENGINE F-27 4R-MRA**







DISCHARGE NOZZLE

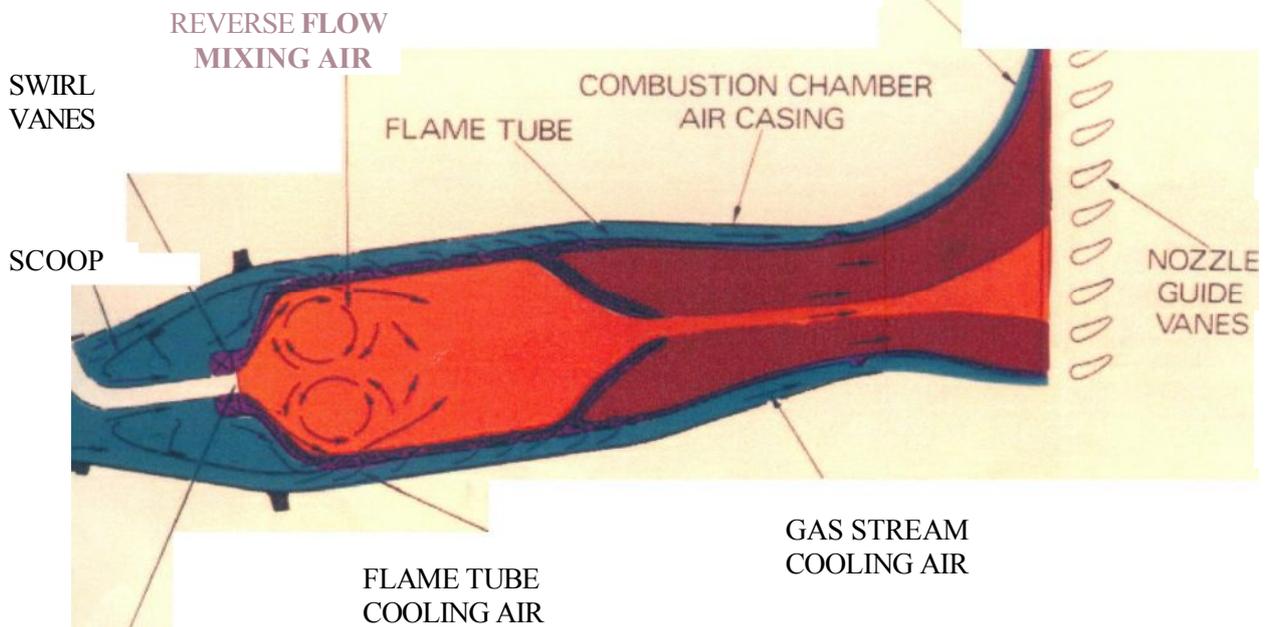




Photo #1: Combustion Chamber #2



Photo #2: Combustion Chamber #1

**APPENDIX - 4 OVERHAUL STRIP REPORT OF THE AGB DRIVE SHAFT****STRIP REPORT**

No: DR/WSTHR 13/XI/ 2007

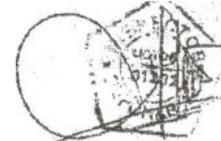
REF WORK ORDER NO : 507/EXPO/X1/20Q7	DATE: DEC 07
WORK SHOP : ACCESSORIES SHOP	

COMPONENT : DRIVE SHAFT CUSTOMER : EXPO AVIATION
PART NO. : GD20-2 CUSTOMER WO. NO :
SERIAL NO. : DRG181/170 REASON OF REMOVAL : DUE OH
AIRCRAFT : F27 CONDITION : US

PARTS REPLACEMENT

NO	PART NAME	PART NO	SERIAL NO	%FT	REMARK
1	WASHER TAB	SP41E	NSN	0	MUST BE REPLACED EVERY OVERHAUL
2	RING OIL SEAL	RSP40-10	NSN	1	MUST BE REPLACED EVERY OVERHAUL
3	CIRCLIP	601017207	NSN	2	MUST BE REPLACED EVERY OVERHAUL
4	CIRGLIP	601017208	NSN	2	MUST BE REPLACED EVERY OVERHAUL

INSPECTOR



A.GUNARD!