



Memorandum for Record

Fabian Salazar
Air Safety Investigator
National Transportation Safety Board
Investigator in Charge

NTSB Accident Number: WPR20LA189
Aircraft Registration & Make/Model: SA-342J / N342J
Accident Location: Minden, NV
Accident Date: June 21, 2020

The following pages are copies of the checklists and notes that were given by the previous maintenance provider to the mechanic who conducted the maintenance on the helicopter after it was handed over to the new owner.

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE.

ANNUAL INSPECTION.

AIRCRAFT REGISTRATION: N342J

DATE: 3-13

AIRFRAME HOURS: 9703.2

WORKSHEET SERIAL NUMBER: 1

SHEET: 1 OF 1

WORK CARD.	GENERAL	ENG.	INSP.
	1. CONCURRENTLY PERFORM AN AFTER FLIGHT, 30, 60 AND 125 HOUR INSPECTIONS. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
32.20.401. 32.20.601.	3. Lubricate the attachment pins in the forward cardan joints on the undercarriage.		
55.00.402.	4. Lubricate the stabiliser bar attachment pins.	✓	
65.11.401.	5. Remove clean and lubricate the main rotor blade attachment pins.		
	6. Carry out a check calibration of the Airspeed Indicator.	FEB 11	
	7. Carry out a check calibration of the Altimeter.	FEB 14	
	8. Carry out a check weigh of the cabin fire extinguisher.	NA	
	9. Check fuselage and Tail Boom drains are free from obstructions. Pay particular attention to the drain holes in the Frangible fairing.		
	10. Check all the exterior and interior aircraft markings and placards for legibility and security of attachment.		
	11. Inspect the aircraft fuel system for microbiological contamination. Pay particular attention to the sump, drain valve and Additional tank fuel drain.		

CERTIFICATE OF RELEASE TO SERVICE

Certifies that the work specified except as otherwise specified was carried out in accordance with JAR-145 and in respect to that work the aircraft/aircraft component is considered ready for Release to Service. Approval Number : CAA.00062.

Ref No. AHL/MS/01

Date: 25.8.1999.

Issue 1

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE

30 HOUR INSPECTION.

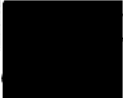
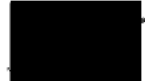
AIRCRAFT REGISTRATION: _____

DATE: _____

AIRFRAME HOURS: _____

WORKSHEET SERIAL NUMBER: _____

SHEET: 1 OF 1.

WORK CARD.	GENERAL	ENG.	INSP.
	1. CONCURRENTLY PERFORM AN AFTER FLIGHT INSPECTION. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
65.12.601. para D 1a.	3. Lubricate Main Rotor Head sleeves with Aeroshell grease 14. 4. Lubricate Swashplate bearing fitted with grease nipple. (30 flying hours or 30 days which ever is the sooner). CAA LETTER TO OWNERS/OPERATORS No:837.		
65.32.602.	5. Inspect the main transmission oil filter (do not dismantle the filter assembly).		
S.B. 05.32. para 2 B 1. FAD 97-144-038	6. Tail Gearbox support tripod. Inspect for cracks at the welds on the 3 arms and 4 lugs on the torus also on the forward foot base at the cut out. 7. VHI/72-H41-5. Inspection of the Main Rotor Droop Stop Ring Supports. Inspect the ring supports to make sure that the clearance between the ring and the support is greater than .018 inch. The dimension is taken by lifting the blade corresponding to the support being checked. If any support is found to be less than .018 inch the support must be replaced.		 

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Issue 1

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE

60 HOUR INSPECTION.

AIRCRAFT REGISTRATION: N342

DATE: 3-13-10

AIRFRAME HOURS: 4703.2

WORKSHEET SERIAL NUMBER: 2

SHEET: 1 OF 2.

WORK CARD.	GENERAL	ENG.	INSP.
	1. CONCURRENTLY PERFORM AN AFTER FLIGHT AND 30 HOUR INSPECTION. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
65.12.601. para D.2.	3. Lubricate Trunnions on Rotating Star and Pitch Change Horns with Aeroshell grease 6.		
76.00.601.	4. Lubricate engine fuel control lever locking pin with Aeroshell grease 8.		
65.40.601. note para. D.	5. Inspect Coupling Drive shaft welded flanges and splined drive for cracks.		
65.12.608.	6. Measure the rotational loads on the Main Rotor Sleeves on Main Rotor Heads pre mod. AMS 07.6108. Lubricated with synthetic oil O.156 and used between 0 and - 50 degrees centigrade.		
65.33.601. para. A.6. FAD 79-250-26	7. Forward and Aft Upper A Frame attachment shackle pins pre mod. AMS 07.6101 (P/N 341A38-4169-20). Remove inspect for cracks and lubricate with AIR 4206. (S.B. 01.16 refers).		
05.23.302. FAD 82-100-31	8. Tail Gearbox upper attachment lug post mod. AMS 07.8546. Inspect for cracks. (S.B. 65.22 refers).		
32.20.601. FAD 80-98-29	9. Jack up the aircraft and inspect the welds on High Flexible Landing Gear Arches for cracks. (S.B. 05.18 ref.)		
65.40.606 para. B. FAD 75-204-16 R1	10 (a). Tail rotor drive shaft bearings P/N 341A34-1115-00 Inspect both faces for loss of grease, rust or damage to seals. Raise shafts and rotate bearings in both directions checking for hard points. (S.B. 05.07 refers).		

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Date: 25.8.1999.

Issue 1

APOLLO

HELICOPTERS LIMITED

WORKSHEET REF: 3

A/C REG: N 342V

250 HOUR INSPECTION

SHEET: 2 OF 2

WORK CARD.		ENG.	INSP.
28.10.404.	11.Lubricate aircraft fuel filter clogging indicator with a few drops of kerosene. SERVICE BULLETIN 05.01. Applicable to 341A35-0112-00 or 0204-00 Clutch Casings. Perform a dye-penetrant inspection in the bolt hole areas of casing to Freewheel Assembly junction.		
FAD 75-40-11 R1.	SERVICE BULLETIN 05.09. Oil Pump / Hydraulic Unit drive gear. Visually inspect splines for condition and lubricate in accordance with para. 1C(1) and 1C(4). CAUTION: Use only kerosene to clean drive gear.		

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Ref No. AHL/MS/01

Date:25.81999.

Issue 1

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE.

250 HOUR INSPECTION.

AIRCRAFT REGISTRATION: 3420

DATE: 3-13-90

AIRFRAME HOURS: 9703.2

WORKSHEET SERIAL NUMBER: 4

SHEET: 1 OF 2.

WORK CARD.	GENERAL	ENG.	INSP.
	1. CONCURRENTLY PERFORM AN AFTER FLIGHT 30, 60 AND 125 HOUR INSPECTIONS. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
55.00.602.	3. Check Horizontal Stabiliser rib clamp bolt torque value.		
65.20.601. para C.	4. Check Tail Rotor Gearbox output shaft end float. Not required on P/N 341A33-5500-08.		
Repair Manual Chap. 5.11 para. 4.1.2.3. FAD 82-62-30. 65.31.601. para 11.	5. Check Freewheel bearing play on the following bearings P/N 341A35-0225-20 (FAFNIR). P/N 341A35-0224-20 or 21 (SNR). Installed on aircraft pre Service Bulletin 05.27. Check Freewheel bearing pre modification AMS 07.9542. TELEX SERVICE No. 05.23.		
28.10.404.	6. Replace paper airframe fuel filter element (without by-pass valve) in filter assembly.		
65.12.606.	7. Monitor Swashplate bearing pre modification AMS 07.6093.		
65.33.601 para. A6. FAD 79-250-26.	8. Inspect A Frame Upper Shackle attachment bolts P/N 341A31-4263-21 post modification AMS 07.6101. Bolts and bushes for cracks and lubricate with grease AIR 4206.		
65.40.602. para. A7a.	9. Check rubber sleeves on Horizontal Drive shaft for bearing movement. If slip mark has moved check play between bearing inner race and sleeve using a feeler gauge.		
05.53.201.	10. Inspect Main Gearbox oil filter for Titanium particles.		

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Ref No. AHI/MS/01

Date: 25.8.1999

ISSUE 1

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE.

250 HOUR INSPECTION.

AIRCRAFT REGISTRATION: 3420

DATE: 3-13-80

AIRFRAME HOURS: 9703.2

WORKSHEET SERIAL NUMBER: 4

SHEET: 1 OF 2.

WORK CARD.		ENG.	INSP.
	GENERAL 1. CONCURRENTLY PERFORM AN AFTER FLIGHT 30, 60 AND 125 HOUR INSPECTIONS. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
55.00.602.	3. Check Horizontal Stabiliser rib clamp bolt torque value.		
65.20.601. para C.	4. Check Tail Rotor Gearbox output shaft end float. Not required on P/N 341A33-5500-08.		
Repair Manual Chap. 5.11 para. 4.1.2.3. FAD 82-62-30. 65.31.601. para 11.	5. Check Freewheel bearing play on the following bearings P/N 341A35-0225-20 (FAFNIR). P/N 341A35-0224-20 or 21 (SNR). Installed on aircraft pre Service Bulletin 05.27. Check Freewheel bearing pre modification AMS 07.9542. TELEX SERVICE No. 05.23.		
28.10.404.	6. Replace paper airframe fuel filter element (without by-pass valve) in filter assembly.		
65.12.606.	7. Monitor Swashplate bearing pre modification AMS 07.6093.		
65.33.601 para. A6. FAD 79-250-26.	8. Inspect A Frame Upper Shackle attachment bolts P/N 341A31-4263-21 post modification AMS 07.6101. Bolts and bushes for cracks and lubricate with grease AIR 4206.		
65.40.602. para. A7a.	9. Check rubber sleeves on Horizontal Drive shaft for bearing movement. If slip mark has moved check play between bearing inner race and sleeve using a feeler gauge.		
05.53.201.	10. Inspect Main Gearbox oil filter for Titanium particles.		

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Ref No. AHI/MS/01

Date: 25.8.1999

Issue 1

APOLLO

HELICOPTERS LIMITED

SA 341 and 342 GAZELLE

125 HOUR INSPECTION.

AIRCRAFT REGISTRATION: 342J

DATE: 3-13

AIRFRAME HOURS: 9703.2

WORKSHEET SERIAL NUMBER: 6

SHEET: 1 OF 2.

WORK CARD.		ENG.	INSP.
	GENERAL 1. CONCURRENTLY PERFORM AN AFTER FLIGHT 30 AND 60 HOUR INSPECTION. 2. REPLACE ANY FINITE LIFE COMPONENTS THAT HAVE COMPLETED PUBLISHED OPERATING LIMITATIONS.		
29.20.601.	3. Main Servocontrol input lever spherical bearing. Check for hard points and lubricate with grease AIR 4206.	<i>Not Due</i>	
32.20.601. note B. FAD 80-98-29.	4. Jack up the aircraft and inspect the welds on Low Flexible Landing Gear Arches for cracks. (S.B. 05.18 ref.)		
65.12.601.	5. Check the Swashplate for play. This is to be carried out if the play is recorded as being greater than 0.9mm. On Main Rotor Heads post modifications AMS.07.6112 and 6113.		
65.31.601.	6. Check Freewheel Cardan Ring pivot pins for wear.		
65.33.601. para. C.	7. Inspect Main Gearbox bushes and Upper A Frame Shackle P/N 341A38-1087-01 to 07 bushes for cracks. Without removing components.		
65.40.606. para C 2. FAD 75-204-16 R1.	8. Release and inspect Tail Rotor Drive shaft bearing attachment straps P/N 341A34-1003-00 pre modification AMS. 07.9021 for cracks at the spot welds.		

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Ref No. AHL/MS/01

Date: 25.8.1999.

Issue 1

APOLLO

HELICOPTERS LIMITED

WORKSHEET REF: 7

A/C REG: 342J

60 HOUR INSPECTION.

SHEET: 2 OF 2.

WORK CARD.		ENG.	INSP.
65.40.606. para. C.	10 (b). Tail rotor drive shaft bearings P/N 330A34-9903-20. Inspect both faces for loss of grease, rust or damage to seals. Raise shafts and rotate bearings in both directions checking for hard points. Noise from bearing is no reason for rejection.		
65.40.606. para. D. 65.40.302.	10 ©. Tail rotor drive shaft bearings P/N 704A33-651-120 or 704A33-651-136. Check axial play is below 0.5mm. Check for slip of the bearings on the rubber sleeves. Inspect both faces for loss of grease, rust or damage to seals. Raise shafts and rotate bearings in both directions checking for hard points.		
65.40.302.	Lubricate bearings with 30 gms of grease AIR 4222 until grease shows at seal, rotate bearings to distribute the grease. Leakage is acceptable in the first 10 hours.		
65.11.701.	11. Clean Main Rotor Blades. 12. SLINGSBY SEATS SAL TP RC3/MM. a) Visually inspect harnesses for fraying, especially around end fittings and stitching. Check buckle unit and inertia reel for operation and wear. Refer to Sect.3 para.3.2. b) Visually inspect surface of seat for cracks and tap surface to locate possible de-lamination within the bulk. Refer to Sect. 1 para. 1.2 R/R Manual.		
72.30.201.	13. Carry out engine compressor cleaning. 14. Service Bulletin 77.02 and Turbomeca TU 195. Inspect engine magnetic chip plug. Remove magnetic plug, mount a metallic shunt across the air gap. Switch on aircraft battery and check the warning light is illuminated.		
65.40.601.	15. Check wear on Coupling Drive shaft splines on post modification AMS 07.9024 shafts. Checking RILSAN coating on splines for condition.		

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Ref No. AHL/MS/01

Date: 29.6.2004.

Issue 3

APOLLO

HELICOPTERS LIMITED

WORKSHEET REF: 5

A/C REG: 342

125 HOUR INSPECTION.

SHEET: 2 OF 2.

WORK CARD.		ENG.	INSP.
	ENGINE.		
	1. Inspect the oil tank and counter casings for damage, distortion, corrosion and security of attachment.		
	2. Inspect the air intake, guard and compressor for damage, distortion, corrosion and security of attachment.		
	3. Inspect the front and rear lifting brackets and cowl hinge pin attachment points for damage, distortion and security of attachment.		
72.50.1.	4. Inspect the turbine casing, exhaust diffuser, turbine and exhaust pipe for damage, distortion, corrosion, cracks and security of attachment. Examine the rear bearing for play (no radial play on the rear bearing support arms).		
72.50.2. Page 203.	5. Check the turbine clearance.		
	6. Inspect the components and electrical looms on the accessory plate for damage and condition.		
72.80.1.	7. Carry out an oil by fuel dilution check.		
72.80.2.	8. Inspect the oil pump strainer.		
72.80.3.	9. Clean and inspect the oil filter.		
73.20.1.	10. Clean and inspect the fuel regulator filter.		
	11. Inspect oil and fuel pipes for wear, chaffing, damage and security of attachment.		
72.80.1.	12. Drain the oil system (only in the case of operation with mineral oil).		
	NOTE: Synthetic oil drainage to be carried out at 1500 or 2 years whichever is the sooner.		

WORK

NA

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Ref No. AHL/MS/01

Date: 25.8.1999.

Issue 1

T U R B O M E C A
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

SYSTEMATIC INSPECTIONS

0. General

Before any inspection the mechanic should refer to log book to take into account, while inspecting, of all the remarks in the pilot's report.

On the other hand he should, after inspecting, record in the engine log book actions, adjustments or replacements he may have had to make during his inspection.

1. Table of systematic inspections

The abbreviations used are :

- Pr.F : for pre-flight
- Po.F : for post-flight
- D : for daily

Description of operation	Pr.F	Po.F	D	Remarks
Ascertain no foreign bodies are near the air intake	X			
Check the 1st stage axial compressor blades condition (if the engine is not fitted with an optional air intake equipment)			X	Chapter 72-30-2 and NOTE 1 hereafter
Check the condition of the air intake screen or of the silencer, or the anti-sand filter if either is fitted to the engine		X		
Check the oil level, top up eventually	X	X		See NOTE 2 hereafter
Ascertain the oil tank plug is actually fitted	X	X		
Check for leakage : at the rear bearing, at the power take-off and at the various jointing planes		X		

T U R B O M E C A
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

Description of operation	Pr.F	Po.F	D	Remarks
Check the engine attachments (condition and tightening)			X	
Check for condition the various safeties, the attachment of accessories and of the electric harnesses			X	
Check the third stage turbine wheel blades		X		
Check the exhaust diffuser (no crack)			X	Chapter 72-50-1
Check the nozzle clamping ring (condition and tightening)	X			Chapter 72-50-1
Check the cowlings (condition and satisfactory closing)	X			
Washing of the compressor after operating in salty or corrosive atmosphere			X	Chapter 72-30-2
Magnetic plug inspection (only on engines pre-mod AB154)		X		Chapter 72-80-2 NOTE 3
Check tightness of pipe unions			X	Refer to NOTE 4 below

NOTE 1 : If the engine is equipped with the anti-sand filter (optional equipment) the inspection of the axial compressor first stage wheel be carried out every 25 hours.

NOTE 2 : In the case where the oil level would have gone up, or if the oil smells of kerosene when the plug is removed from the oil tank, take a sample of oil and determine the amount of contamination. With "out of tolerance" contamination drain the tank and replenish (see 72-80).

NOTE 3 : Only on engines post-mod AB154 (magnetic plug with electrical indication), the magnetic plug inspection will be carried out every 50 hours.

NOTE 4 : Check the position of unions on pipes (alignment of varnish or red paint marks).

T U R B O M E C A
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

PERIODIC INSPECTIONS

0. General

A. Maintenance cycle

The maintenance cycle is based on engine operating hours.

Five types of inspection are provided for :

- 1) Variable frequency inspections.
- 2) 125-hour inspections or yearly, to which the variable frequency inspections may be added.
- 3) 500-hour inspections or 24 months (abbreviation used T1) to which the inspection planed in 125-hour inspection are added.

NOTE: The 500-hour frequency can reach 540 hours.
The two-year frequency can reach 25 months.
These tolerances are not to be accumulated.

- 4) 1000-hour inspections or T2 to which the inspections planed in 125 and 500-hour inspections are added.
- 5) Special inspections not subjected to any frequency.

B. Operating hours

The operating hours must be counted on the following basis: the accumulated time intervals between wheels-off (or skids-off) and wheels-on (or skids-on). The operating hours must be recorded in the engine log book.

TURBOMECA
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

1. Periodic inspection table

A. Variable frequency inspections

This table shows the maximum periodicity allowed.

DESIGNATION OF OPERATIONS	HOURS	REMARKS
Compressor cleaning	25	Refer to 72-30-2
Oil spectrometric analysis		Refer to 72-80-2 and NOTE hereafter
Replacement of fuel control unit fuel filter		Refer to 73-20-1 As soon as air frame fuel filter becomes clogged.
Inspection of the magnetic plug with electrical indication	50	Refer to 72-80-2
Draining of engine oil system and cooler only in the case synthetic oil is used	1 500 or 2 years	Refer to 72-80-2 and Helicopter Doc.

NOTE: The oil spectrometric analysis is not mandatory, however, it enables better condition monitoring and gives early warning of engine deterioration.

B 125-hour inspection or yearly

DESIGNATION OF OPERATIONS	REMARKS
Inspection of the turbine clearance	Chap. 72-50-2
Draining of the engine oil system and tank <u>only in the case mineral</u> oil is used	Chap. 72-80-1 and Helicopter Documentation
Inspection and cleaning of the oil filter cartridge	Chap. 72-80-3
Measure of fuel dilution rate into oil	Chap. 72-80-1
Inspection of 3 rd stage nozzle guide vane	Chap. 72-50-1
Inspection of rear bearing (no radial clearance in the arms when handling them)	
Check for leaks of the flow-limiter membrane	Chap. 73-20-1

T U R B O M E C A
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

C. 500-hour inspection or 24 month or T1

DESIGNATION OF OPERATIONS	REMARKS
Inspection of axial compressor 1st stage wheel	Chap. 72-30-2
Inspection of engine external parts to check absence of corrosion	
Inspection of electrical connectors (condition and tightness)	
Check of correct location of the axes of the fuel control unit control linkage and check of correct travel of the latter	Refer to Helicopter Manual
Replacement of the fuel control unit fuel filter or replacement of its cartridge (engine post-mod AB140)	Chap. 73-20-1
Check of bleed valve operation	
Cleaning of torch-igniters bleed air tap	Chap. 75-20-1
Test run-up comprising the check of the maxi regulated rate.	Chap. 72-00-3 Chap. 73-20-1

T U R B O M E C A
ASTAZOU XIV H TURBOSHAFT ENGINE
MAINTENANCE MANUAL

D. 1000-hour inspection or T2

DESIGNATION OF OPERATIONS	REMARKS
Check condition and attachment of bonding braids	
Inspection of torch-igniter cables condition	
Check of turbine casing drain valve operation	Chap. 72-40-1
Check of four-way union operation	Chap. 75-20-2
Check of igniter coil operation	Chap. 74-10-1
Check of igniter micropump operation	Chap. 73-10-1
Check of fuel electric valve actuator operation	Chap. 73-20-1
Check of torch-igniters operation	Chap. 73-10-2
Inspection of generator starter brushes	Chap. 80-10-1
Insulation measurement of starter-generator	Chap. 80-10-1
Check of control and indicating harness	Chap. 80-20-1
Check of temperature indicating harness	Chap. 77-20-1