FINAL INVESTIGATION REPORT

SERIOUS INCIDENT (FLAME OBSERVED IN RIGHT ENGINE) AIRBLUE FLIGHT ABQ-410, AIRBUS 321-211 AIRCRAFT, REG. NO. AP-BMP, AT AIIAP, LAHORE ON 02-08-2022

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SCOPE

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ABBREVIATIONS

AAMAs	Airline Aviation Medical Advisors
AIIAP	Allama Iqbal International Airport
AMI	Aero Medical Institute
ATCO	Air Traffic Controller Officer
ATPL	Air Transport Pilot Licence
ATS	Air Traffic Services
BASIP	Bureau of Aircraft Safety Investigation Pakistan
BEA	Bureau of Enquiry and Analysis
BSI	Borescope Investigation
CPL	Commercial Pilot Licence
DFDR	Digital Flight Data Recorder
EGT	Exhaust Gas Temperature
FO	First Officer
h	Hour(s)
HPC	High-Pressure Compressor
HPT	High-Pressure Turbine
ICAO	International Civil Aviation Organization
IOU	Incident And Occurrence Unserviceability Report
LPC	Low Pressure Compressor
LPT	Low Pressure Turbine
m	Minute (s)
OEM	Original Equipment Manufacturer
PAA	Pakistan Airport authority
PAF	Pakistan Air Force
PASI	Pakistan Aircraft Safety Investigation
PCAA	Pakistan Civil Aviation Authority
PFR	Post Flight Report
PS	Persistent State
PSI	Pounds per square inch
R/W	Runway
s	sec
SOP	Standard Operating Procedures
UTC	Universal Time Coordinated
VBV	Variable Bleed Valve

INTRODUCTION

This serious incident was reported to Bureau of Aircraft Safety Investigation Pakistan (BASIP) by Pakistan Airports Authority (PAA) vide Incident Occurrence and Unserviceability Report (IOU)[1]. This serious incident was notified[2] to International Civil Aviation Organization (ICAO), Bureau of Enquiry and Analysis (BEA) for Civil Aviation Safety, France in line with Annex-13. The investigation has been conducted by BASIP.

[1] PAA IOU Report dated 17th January, 2025
[2] Notification to ICAO

SYNOPSIS

On 02nd August, 2022, Airblue Flight ABQ-410, Airbus 321 aircraft, Registration No. AP-BMP took-off from Allama Iqbal International Airport (AIIAP), Lahore to perform a schedule passenger flight to Dubai International Airport, Dubai with 8 crew members and 231 passengers on board.

During take-off, Air Traffic Controller Officer (ATCO) observed flames in right engine / Engine No.2. ATCO observation was communicated to the Flight Crew. Pilot reported all operations normal and requested to land back as a precautionary measure. Afterward, ABQ-410 landed safely at AIIAP, Lahore.

Based on the available data, a bird strike occurred at the end of previous flight, which likely contributed to observation of flames and a right engine stall warning during the subsequent event flight. Bird ingestion was confirmed, with remains found at the roots of fan blades No.1, No.35, and No.36, and a large quantity of debris detected throughout the primary flow path. The ingestion impacted the Variable Bleed Valve (VBV) doors, resulting in its misalignment. Additionally, one blade in the High-Pressure Compressor (HPC-1) was found torn and cracked, while two others showed damage consistent with radial contact and/or bird impact. Further inspection revealed contamination in the Combustion Chamber and High-Pressure Turbine (HPT), indicating that the bird ingestion adversely affected engine components and airflow, ultimately leading to the engine stall. Digital Flight Data Recorder (DFDR) analysis also indicates that the engine experienced a stall lasting approximately 6 sec (s), during which the Persistent State (PS3) pressure dropped significantly from 400 Pound per square inch (PSI) to 120 PSI. This was accompanied by corresponding decreases in N1, N2, and fuel flow, along with a noticeable shift in Exhaust Gas Temperature (EGT), consistent with engine stall characteristics. All engine parameters returned to the normal range, in line with the sister engine.

SECTION 1 - FACTUAL INFORMATION

1.1. History of the Flight

1.1.1. On 02nd August, 2022, Airblue flight ABQ-410, Airbus 321 aircraft, Registration No. AP-BMP, took-off from Allama Iqbal International Airport (AIIAP), Lahore to perform a schedule passenger flight to Dubai International Airport, Dubai, with 8 crew members and 231 passengers on board.

1.1.2. At 09:30:15 h, (frequency 118.1 data) ABQ-410 took-off from Runway (R/W) 36 R, AIIAP, Lahore.

1.1.3. At 09:30:18 h, ATCO observed two (02) flames from rear end of the right engine / Engine No.2 during take-off. ATCO informed Pilot about his observation and inquired to confirm whether all operations are normal.

1.1.4. At 09:30:24 h, Pilot reported, all engine parameters are normal. however, requested to land back as precautionary measure.

1.1.5. At 09:42:00 h, ABQ-410 landed safely at AIIAP, Lahore.

1.1.6. On arrival, Engine No. 2 Stall "ENG 2 STALL" warning reported on the Post Flight Report (PFR)[3].

1.1.7. Aircraft documents show that bird strike occurred at the end of previous flight with no visual damage or FOD. Borescope inspection was not carried out as per Airbus AMM Task 72-00-00-200-006-A – Inspection, FOD associated with normal engine parameters, which allows for a delay in the borescope inspection for 25 flight hours or 10 flight cycles provided FOD did not result in missing material to the fan blades.

1.2. Injuries to Person(s)

1.2.1. No injury was reported to any person on board the aircraft or on ground. Details of the injuries sustained by the Cabin Crew and passengers are as follows: -

Injuries	Crew	Passengers	Total in the Aircraft	Others
Fatal	Nil	Nil	Nil	Nil
Serious	Nil	Nil	Nil	Nil
Minor	Nil	Nil	Nil	Nil
None	08	223	231	Nil
Total	**08**	**223**	**231**	**Nil**

Table 1 Details of Injuries to Persons On-Board

1.3. Damage to Aircraft

1.3.1. No damage to the aircraft was reported at the time of the occurrence.

[3] Post Flight Report (PFR) on dated 02 August, 2022

1.4. Other Damage

1.4.1. No other damages were reported.

1.5. Personnel Information

Captain / Pilot Monitoring	
License type	Air Transport Pilot Licence (ATPL)
Medical status	Class – 1
Flying experience	10352:31 h
On type	2877:06 h

Table 2 Captain's Brief Description

First Officer (FO) / Pilot Flying	
License type	Commercial Pilot Licence (CPL)
Medical status	Class – 1
Flying experience	5000 h
On type	3600 h

Table 3 FO's Brief Description

1.6. Aircraft Information

ABQ-410	
Operator	Airblue
Call Sign	ABQ-410
Aircraft Make & Model	Airbus 321-211
Registration Number	AP-BMP
Serial Number	6119
Year of manufacturing	2014
Sector	Lahore to Dubai
Flight Conditions	Normal

Table 4 Aircraft Information

Engine Details	
Engine Model	CFM56-5B
ESN	569278

Table 5 Engine Details

1.7. Meteorological Information

1.7.1. Not Applicable.

1.8. Aids to Navigation

1.8.1. Navigational aids for AIIAP, Lahore are provided below. At the time of serious incident, no abnormality was reported.

TYPE OF AID	ID	Frequency	Hours of operation	Site of transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
ILS/LOC CAT I 36L	ILO	109.7 MHz	H24	313223.67N 0742410.54E	NIL	NIL
ILS/LOC CAT III 36R	ILA	109.9 MHz	H24	313224.49N 0742417.66E	NIL	Coverage 20 NM
NDB	LA	268.0 kHz	H24	313123.41N 0742348.18E	NIL	NIL
DVOR/DME (2°E/2020)	LA	112.7 MHz CH74X	H24	313109.66N 0742400.05E	227.07M	200NM
MM	-	75.0 MHz	H24	312949.99N 0742414.91E	NIL	RWY 36R
OM	LO	338.0 kHz	H24	312641.15N 0742404.47E	NIL	Locator Outermarker RWY 36R
OM	-	75.0 MHz	H24	312641.50N 0742404.51E	NIL	RWY 36R
GP/TDME 36L	ILO	333.2 MHz CH34X	H24	313042.70N 0742403.86E	235.31M	NIL
GP/TDME 36R	ILA	333.8 MHz CH36X	H24	313033.31N 0742412.15E	231.04M	Coverage 7-10 NM

Table 6 Radio Navigation & Landing Aids AIIAP, Lahore

1.9. Communications

1.9.1. Communication frequencies for AIIAP, Lahore are provided below. At the time of serious incident, no abnormality was reported.

Service designation	Call sign	Frequency	Hours of operation	Remarks
1	2	3	4	5
APP	Lahore APP	121.300 MHZ	H24	Primary
APP	Lahore APP	121.500 MHZ	H24	Emergency
APP	Lahore APP	125.300 MHZ	H24	Secondary
ATIS	ATIS	126.300 MHZ	H24	NIL
BS	Radio Pakistan	630.000 KHZ	HX	0130 --1900 HR
BS	Radio Pakistan	1090.000 KHZ	HX	Variable SKED
GCA	Lahore Ground	118.400 MHZ	H24	Primary
GCA	Lahore Ground	121.800 MHZ	H24	Secondary
TWR	Lahore Tower	118.100 MHZ	H24	Primary
TWR	Lahore Tower	118.875 MHZ	H24	Secondary

Table 7 Communication Facilities, AIIAP, Lahore

1.10. **Aerodrome Information**

1.10.1. Aerodrome data of AIIAP, Lahore is provided below. At the time of serious incident, no abnormality was reported.

Designations RWY NR	True bearing	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY	Slope of RWY/SWY
1	2	3	4	5	6	7
18L	180.88°	3360 x 45	110/R/B/W/T Concrete	313212.13N 0742417.44E	THR 217.65 M / 714.06 FT	0.050%
36R	0.88°	3360 x 45	110/R/B/W/T Concrete	313023.08N 0742415.49E	THR 215.93 M / 708.43 FT	-
18R	180.87°	2743 x 46	69/F/C/X/U ASPH	313202.10N 0742410.19E	THR 216.50 M / 710.30 FT	0.050%
36L	0.87°	2743 x 46	69/F/C/X/U ASPH	313033.10N 0742408.60E	THR 214.80 M / 704.72 FT	-

SWY dimension (M)	CWY dimension (M)	Strip dimension (M)	RESA dimension (M)	Arresting system	Obstacle Free Zone	Remarks
8	9	10	11	12	13	14
150 X 75	305	3724 x 300	122 x 90	-	Available	RWY Shoulder of 15M width avbl on either side of RWY
150 X 75	305	3724 x 300	122 x 90	-	-	
244	244	3381 x 300	92 x 90	-	Available	-
274	274	3381 x 300	92 x 90	-	-	-

Table 8 Aerodrome Information – R/W Physical Characteristics AIIAP, Lahore

1.11. **Flight Recorders**

1.11.1. DFDR analysis revealed, approximately after 30 s full throttle, the PS3 dropped from 400 PSI to 120 PSI, the N1 & N2 and Fuel flow decreased in line with the PS3, and EGT shifted. This is a signature of an engine stall.

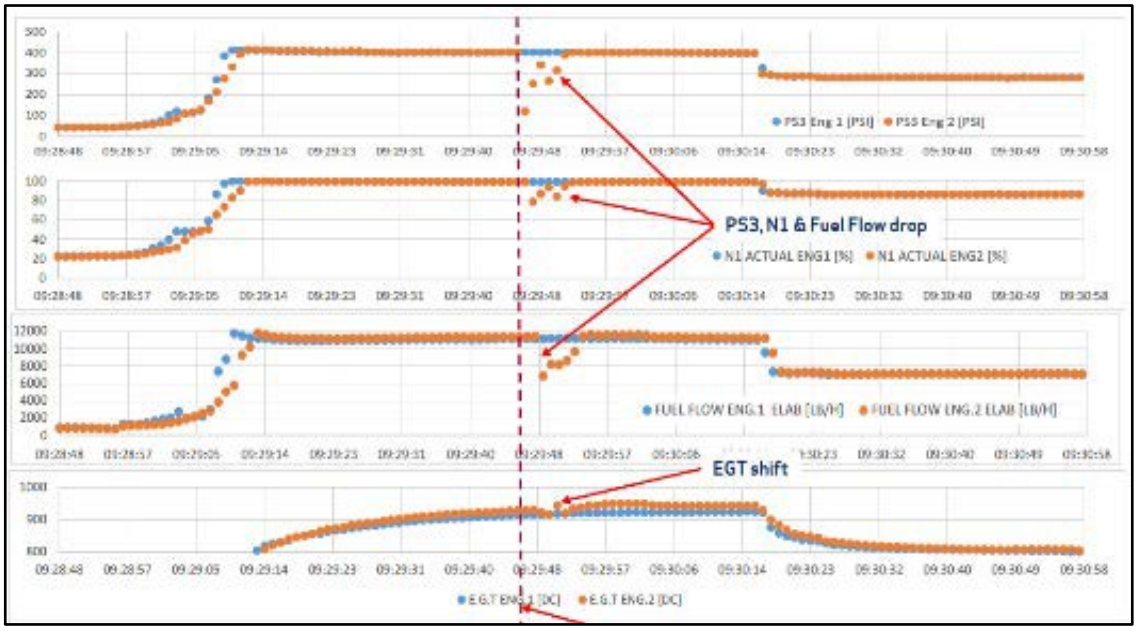

Figure 1 PSI of Engine No 1 2

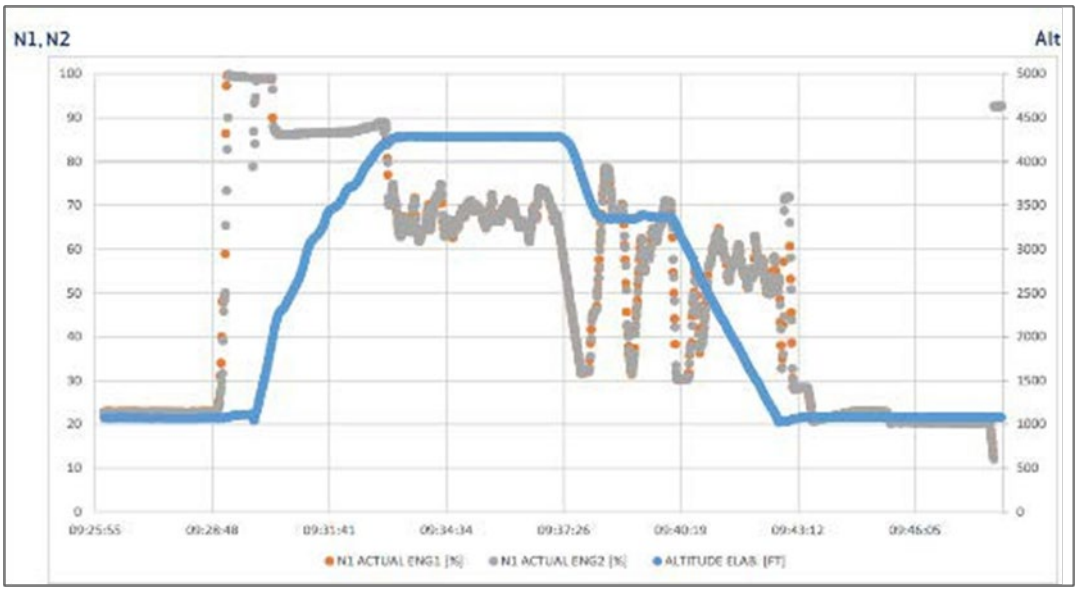

Figure 2 Engine Parameters

1.11.1.1. After 6 s, all engine parameters return to the normal range, in line with the sister engine.

1.12. Wreckage and Impact Information

1.12.1. Not Applicable.

1.13. Medical and Pathological Information.

1.13.1. Medical samples for pathological examination of the Flight Crew were conducted.

1.14. Fire

1.14.1. During Takeoff roll, ATCO twice observed flames from rear side of the right engine (Engine No. 2). ATCO informed Pilot about his observation. Pilot reported that all engine parameters are normal, however, executed precautionary landing.

1.15. Survival Aspects

1.15.1. Not Applicable.

1.16. Test and Research

1.16.1. After removing Engine No. 569278, from the aircraft, it was dispatched to Maintenance Repair Overhaul (MRO), SR Technics Switzerland where a Tear down examination was carried out[4].

[4] C 17 11 2022 921296 CR MISSION SRT – (OEM Report)

1.16.2. **Preamble on stall margin:**

1.16.2.1. A stall occurs when the compressor operating point and the stall limit are at the same level (zero stall margin). This can occur either from a high operating point or from a stall line lower than normal. Thrust lever movements (engine transients) are not the only reason that can affect the stall margin. Other elements can raise the operating line or lower the stall line: distortion, thermal effect.

1.16.2.2. **Thermal effect on stall margin –** When T/O thrust is selected, the thermal effect on the different parts of the HPC (disk, blades, casing) impacts the clearance such that it is maximum after 30 s to 1 min, which has a negative impact on the stall margin.

1.17. Organizational and Management Information

1.17.1. **Airline Operator –** The Airblue is a private Pakistani airline operator with its head office in Islamabad, Pakistan. Airblue operates scheduled domestic and international flights.

1.18. Additional Information

1.18.1. Not Applicable.

1.19. Use of Effective Investigation Techniques

1.19.1. Standard investigation procedures and techniques were used.

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SECTION 2 – ANALYSIS

2.1. General

2.1.1. On 2nd August, 2022, Airblue flight ABQ-410 took off from AIIAP, Lahore. During take-off roll, ATCO observed flames coming out from rear of right engine **twice** and the same observation was communicated to the pilot. Pilot reported all engine parameters are normal and requested to land back as a precautionary measure at AIIAP, Lahore.

2.2. Flight Operations

2.2.1. Not Applicable.

2.3. Aircraft

2.3.1. The subject engine (Engine No.02) was removed and sent to the SR Technics, Switzerland for tear down examination.

2.3.2. Prior to the event flight, bird-strike reported with this aircraft, which lead to the engine stall during event flight. Tear down inspection at MRO report revealed bird ingestion was found at the root of fan blades No.1, No.35 & No.36.

2.3.3. Bird ingestion into the Engine can cause series of findings and potential malfunctions that can result in engine stall, details can be seen in figure below: -

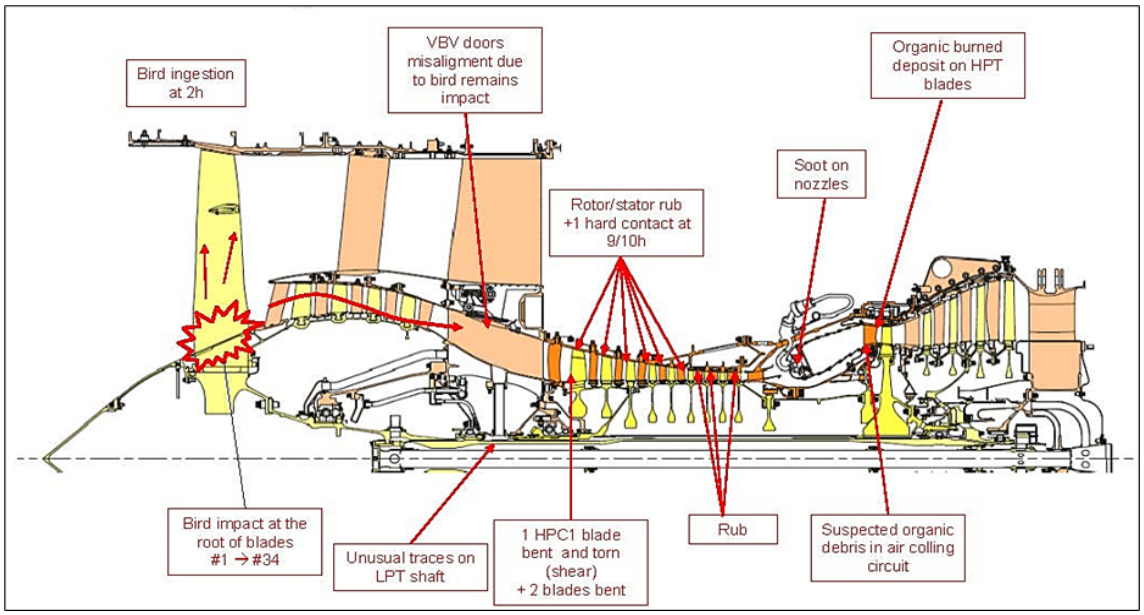

Figure 3 Bird Strike Cause Series of Failure / Malfunction

2.3.4. **FAN** – FAN case module has large quantity of bird remains on primary flow path. Bird ingestion was founded on Fan blades No. 1, No. 35 and No. 36, its impact was at the root of the blade. Impact on VBV doors was founded and they were misalignment.

2.3.5. **Fan Module Sides Overview** – No abnormality was found / seen in Engine Fan Modules during analysis.

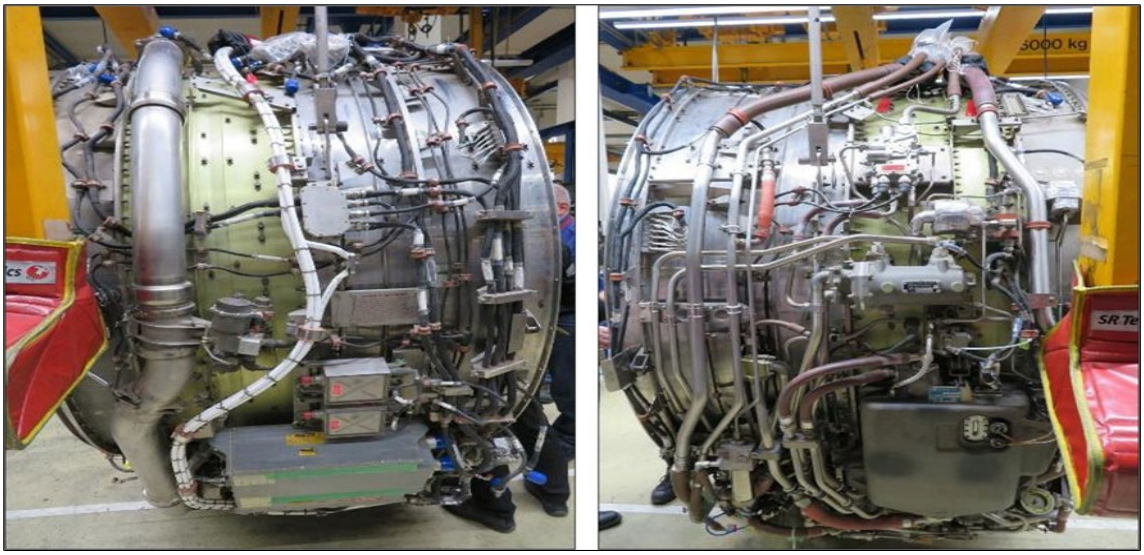

Figure 4 Fan Module Sides Overview

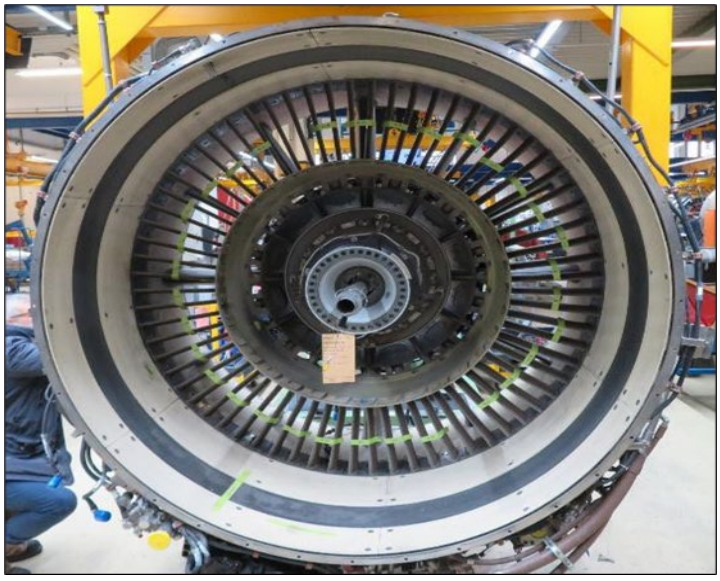

Figure 5 Fan Case Module FWD overview

2.3.5.1. **Flow path separator:** No evidence of bird remains; this part may have been cleaned by the operator after the bird strike.

Figure 6 Flow path Separator

2.3.5.2. **FAN Case module FWD:** FAN Case module FWD primary flow path exhibited large quantity of bird remains from 2:30 to 6 o clock.

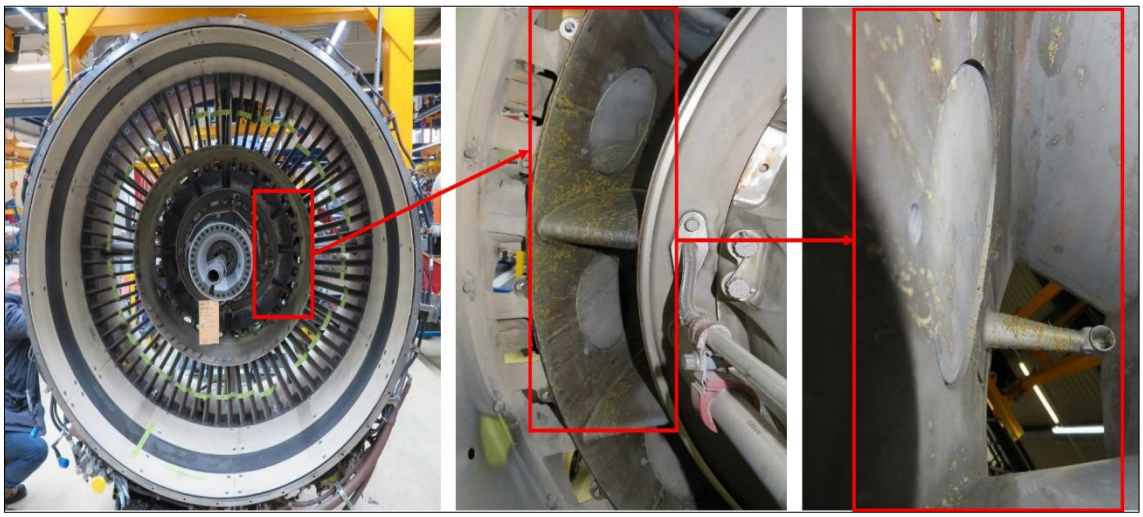

Figure 7 FAN Case Module FWD Primary Flow Path

2.3.5.3. **Variable Bleed Valve (VBV) doors:** VBV doors misaligned due to bird impact.

Figure 8 VBV Doors Misalignment due to Bird Impact

2.3.5.4. **FAN Case module:** Black light inspection was carried out for inspection of organic traces on OGVs.

Figure 9 FAN Case Module, Black Light Inspection

(a) Fan Case module AFT large quantity of bird remains from primary flow path from 2h30 to 6h can be seen.

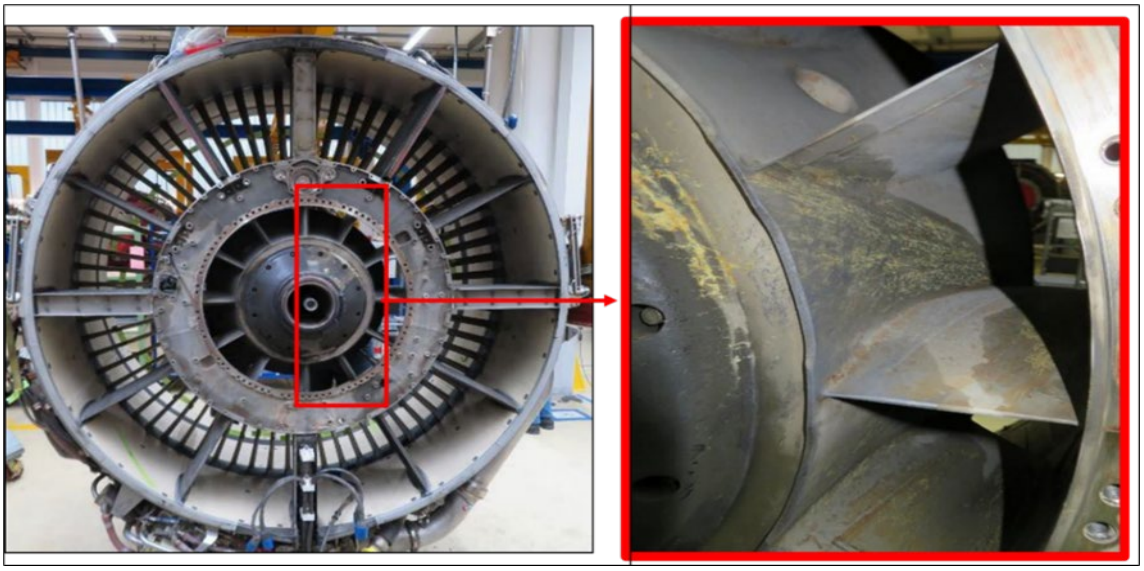

Figure 10 FAN Case Module AFT (2h30 to 6h)

2.3.5.5. **Fan Blade:** Fan blade No. 36 Area (A) of Impact is shown in highlighted portion, Bird remains can be seen.

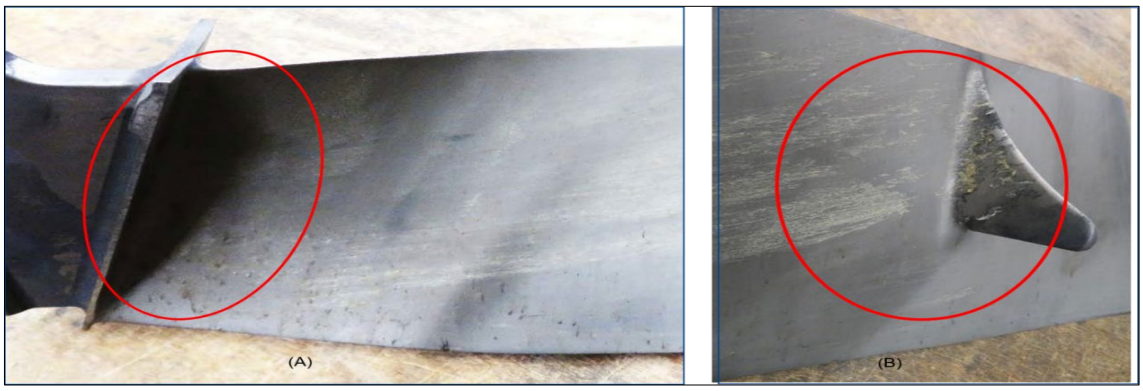

Figure 11 Fan Blade No.36, Bird Remains Traces

(a) Black light inspection showed bird remain traces from the root of the blade.

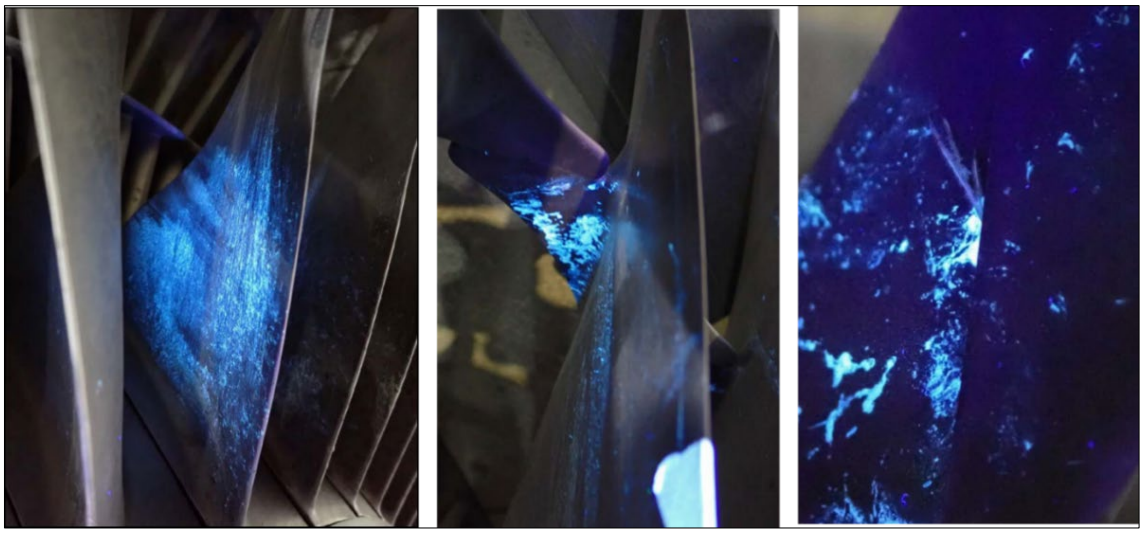

Figure 12 Fan Blades Black Light Inspection

2.3.5.6. **Core Module –** Evidence of bird remains found in flow path. In HPC Case inspection, in all stages Rubbing evidence was found. Radial rotor / stator hard contact evidence in 1 location (9/10h). In all stages HPC blade damage evidence within shop manual limits. Organics deposit found on HPT blades (LE and concave side).

2.3.5.7. **Low Pressure Compressor (LPC) FWD side** evidence of local (below 3h) bird remains. No blade / vane distortion seen.

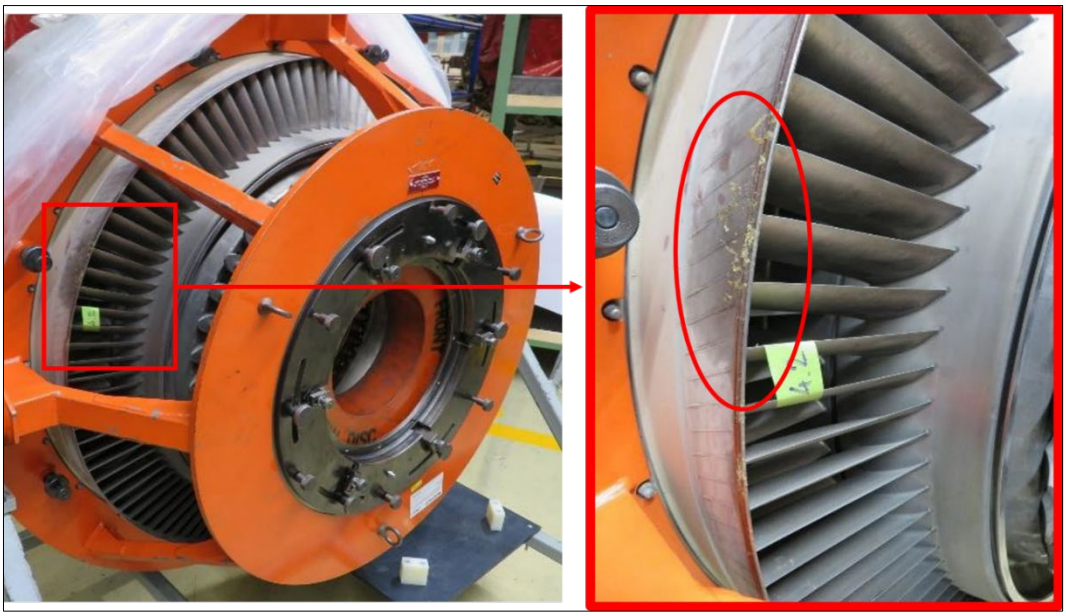

Figure 13 LPC FWD Side (below 3h)

(a) LPC AFT side evidence of large quantity of bird remains (3h-6h). No blade/vane distortion seen.

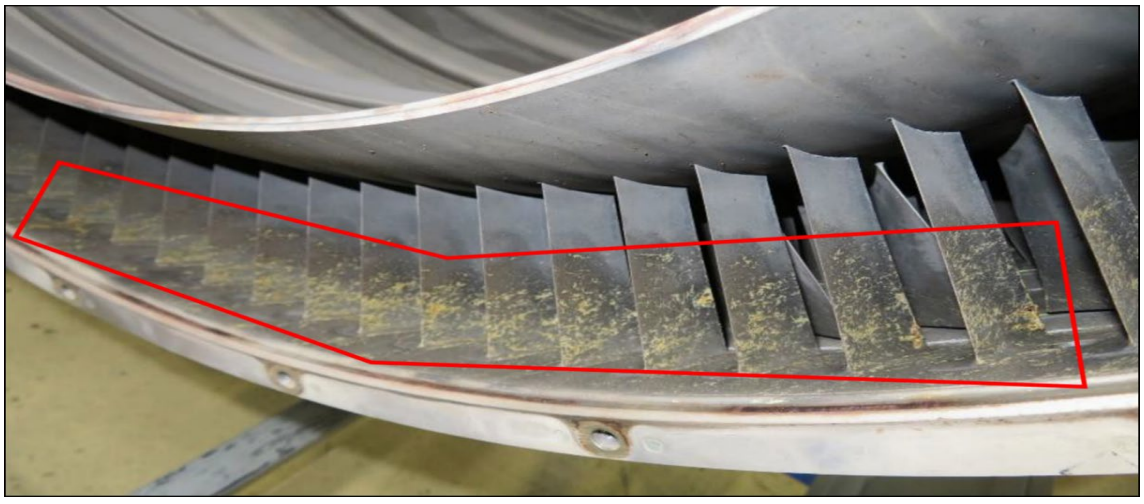

Figure 14 LPC AFT Side (3h-6h)

2.3.5.8. **HPC 3h side:** No evidence of torn / disengaged lever arm (TBC).

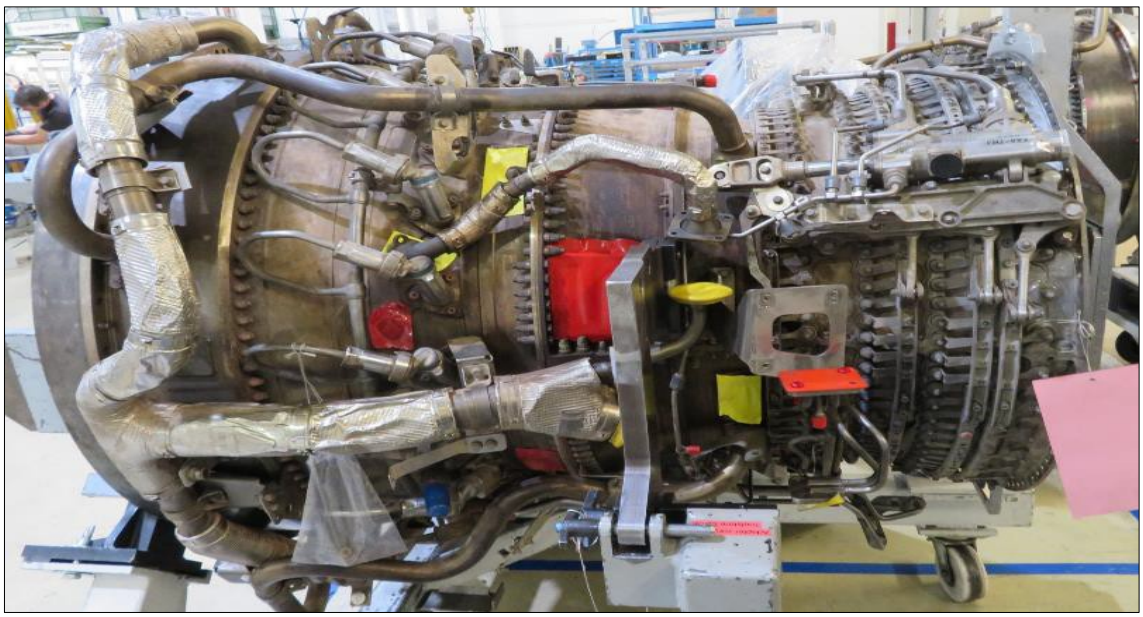

Figure 15 HPC 3h side View

2.3.5.9. **High Pressure Compressor (HPC) FWD Side**: Bird remains on primary flow path.

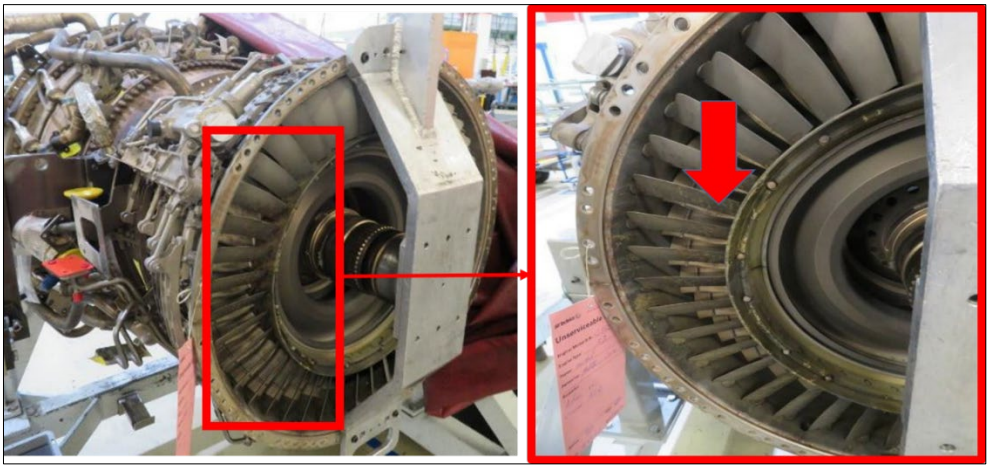

Figure 16 HPC FWD Detail

(a) Main boroscopic inspection finding is 1ea CHP1 blade with LE badly damaged.

Figure 17 Main Boroscopic Inspection

(b) HPC rotor inspection, one (1) HPC1 blade bent and torn from LE on mid span area.

Figure 18 HPC Rotor Inspection

(c) **HPC** rotor inspection two (2) other HPC1 blade bent but not torn. Moderate rub at the top of all the blades.

Figure 19 HPC1 blade bent but not torn

(d) **HPC** rotor inspection all blades (all stages) exhibit tip TE erosion evidence and moderate rub at the top.

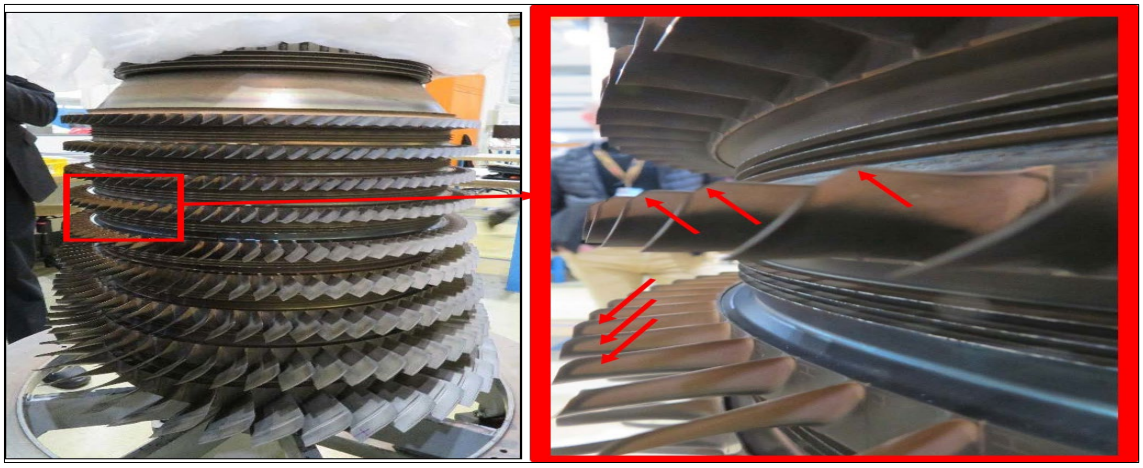

Figure 20 HPC Rotor Inspection

Figure 21 FWD HPC stator inspection

(e) **FWD** HPC stator inspection, no major damage seen.

(f) **FWD** HPC upper stator inspection HPT1 blade contact (between 9h & 10h) HPT2 contact evidence.

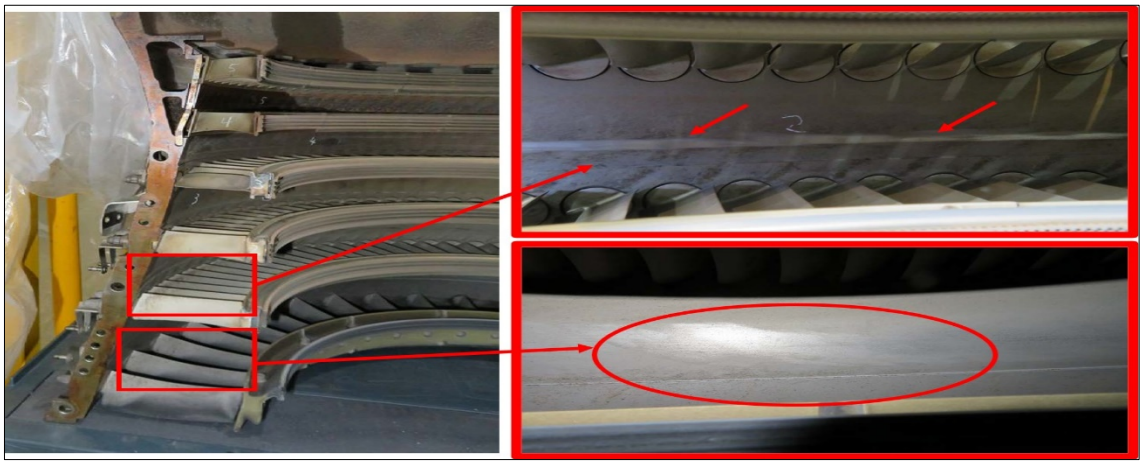

Figure 22 FWD HPC Upper Stator Inspection (HPT1 & HPT2)

(g) **FWD** HPC upper stator inspection HPT3 and HPT4 local hard contact (between 9h & 10h) + rub.

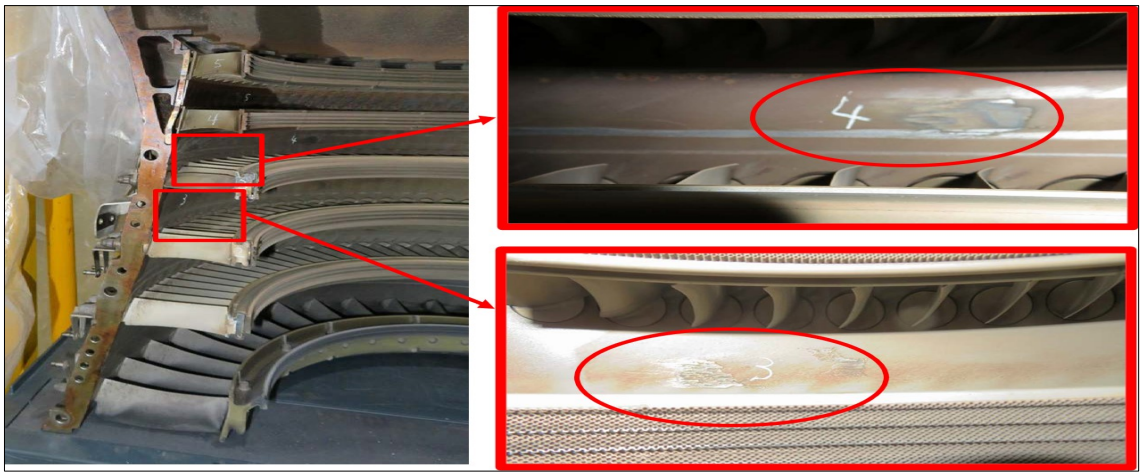

Figure 23 FWD HPC Upper Stator Inspection HPT3 & HPT4

(h) FWD HPC upper stator inspection HPT 5 local hard contact (between 9h & 10h) + rub.

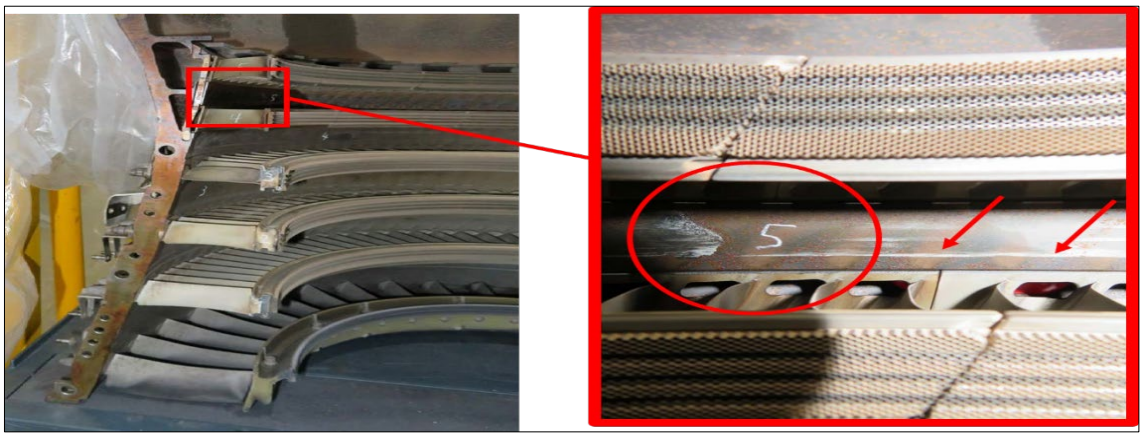

Figure 24 FWD HPC Upper Stator Inspection (HPT 5)

(i) In FWD HPC lower stator inspection revealed Organic remains.

Figure 25 FWD HPC Lower Stator Inspection

(j) In AFT HPC stator inspection Rub evidence can be seen.

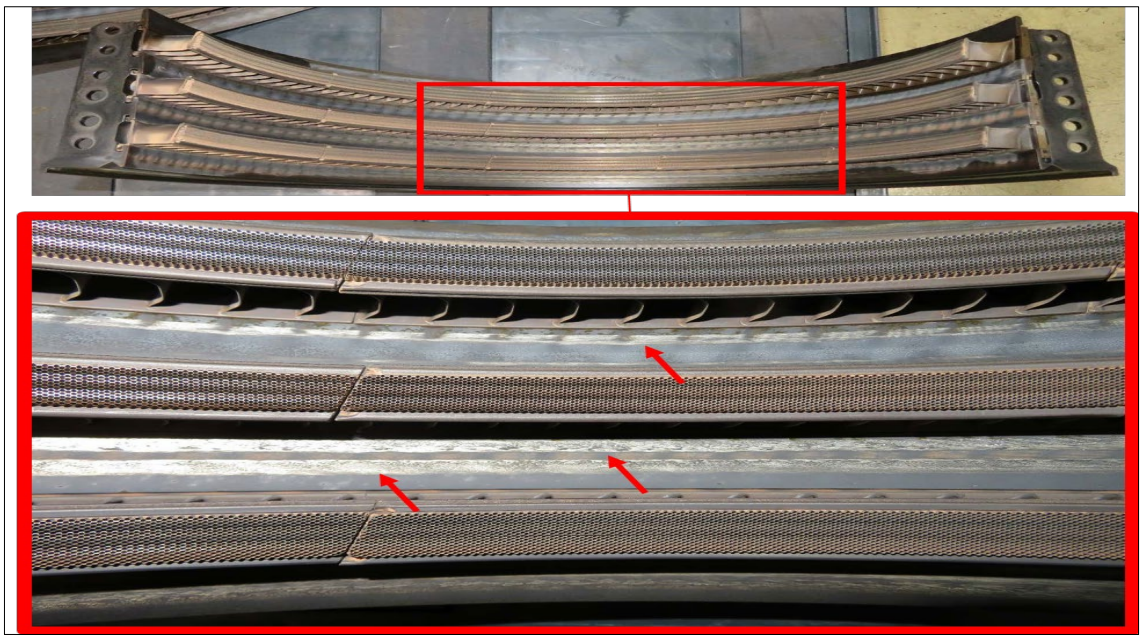

Figure 26 AFT HPC Stator Inspection

(k) **Combustion case inspection**: Usual condition, soot evidence on nozzles.

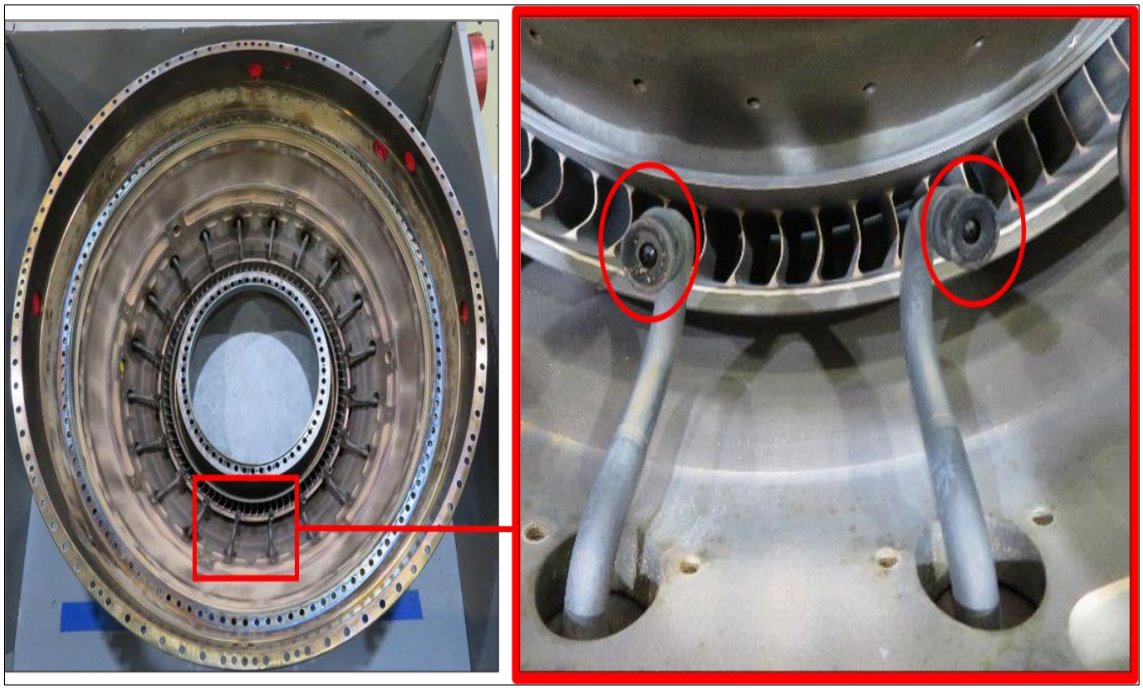

Figure 27 Combustion case inspection

(l) **Combustion chamber inspection**: Usual condition except local deposits.

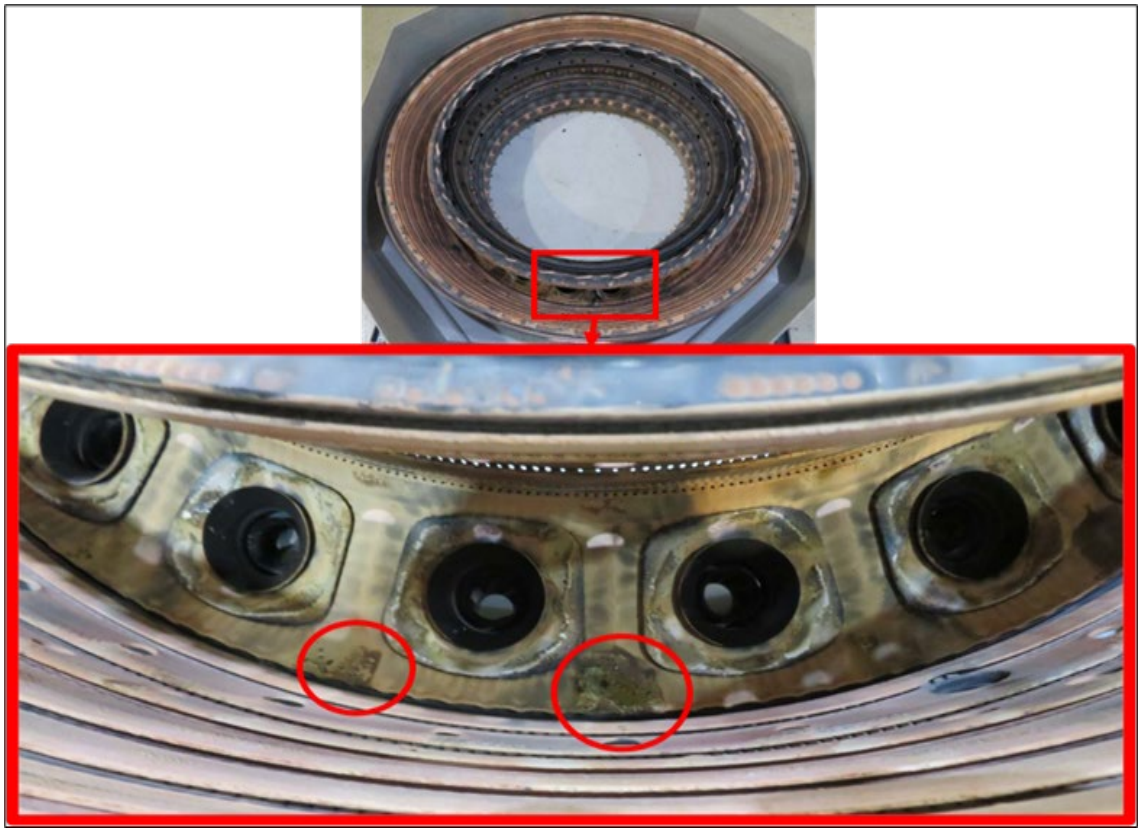

Figure 28 Combustion chamber inspection

(m) **FWD and AFT HPT nozzles overview:** FWD and AFT HPT nozzles are in usual condition.

(n) **High Pressure Turbine (HPT) Rotor:** HPT rotor inspection AFT side showed nothing un usual. Top of blades one notch can be seen.

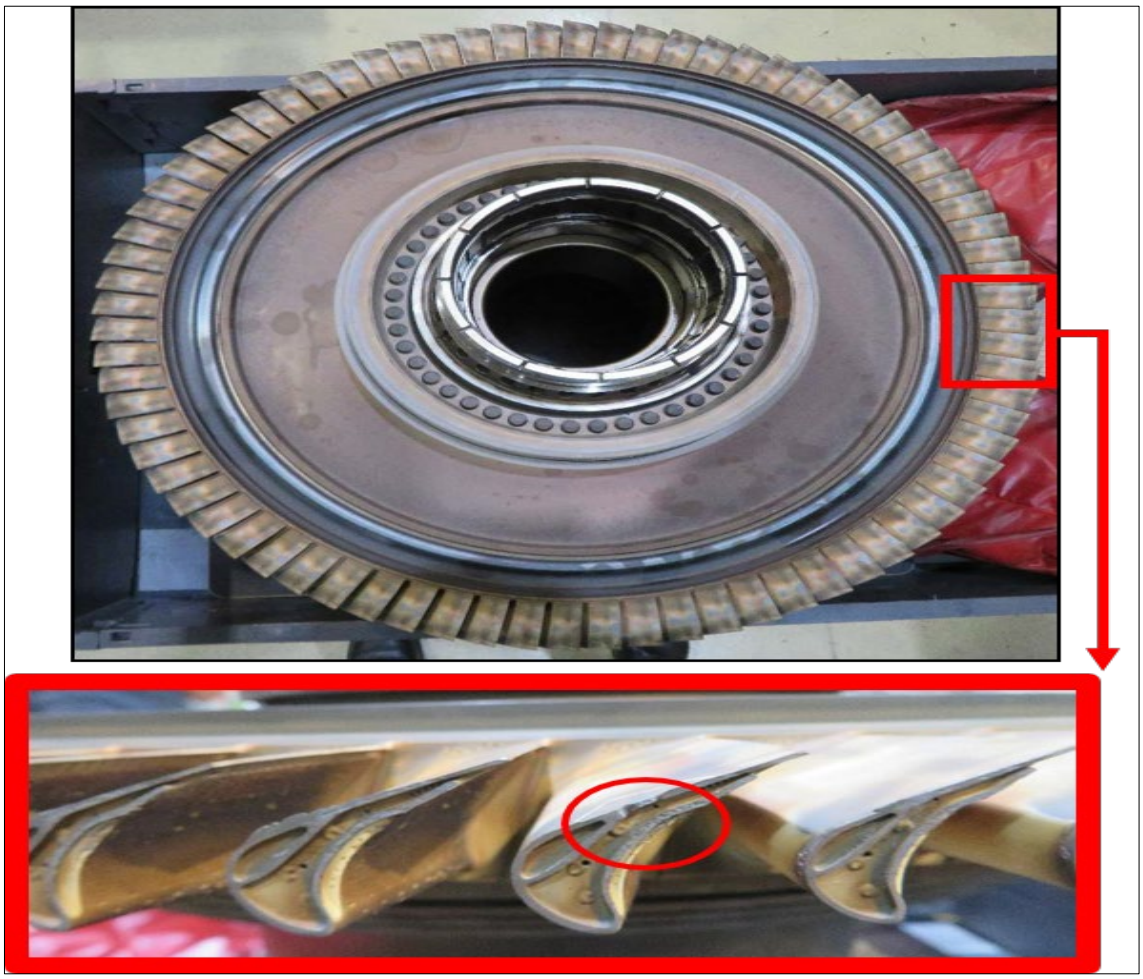

Figure 29 HPT Rotor Inspection AFT side

(o) **HPT rotor inspection:** Carbonised remains deposit on blades LE and concave side.

Figure 30 HPT rotor inspection

2.3.5.10. **Low Pressure Turbine (LPT) module –** LPT was in good condition. Unusual traces were founded on LPT shaft balancing area.

(a) **LPT 1 nozzles**: Nothing to report.

(b) **LPT:** LPT inspection unusual rotated contact evidence can be seen on LPT shaft balancing area.

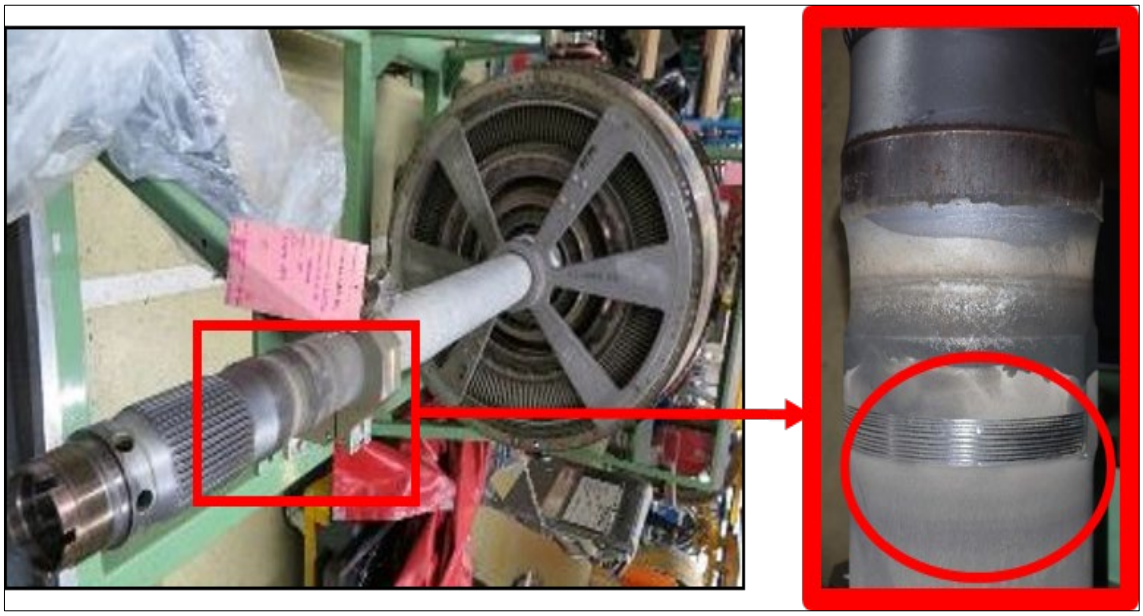

Figure 31 LPT Inspection

2.4. Medical Analysis

2.4.1. Though the occurrence was of a technical nature; however, in order to rule out human error, the medical examination of the crew inclusive of Blood and Urine sampling was carried out. It has been established that the doctor on site at AIIAP, Lahore handled the serious incident professionally and carried out sampling of both the crew members within stipulated time frame, strictly in line with ANO-002. During the course of the investigation, it was reported by the operator M/s Airblue that Captain is a known case of Diabetes Mellitus and is already undergoing medical treatment. However, following the serious incident Airblue Flight Surgeon and the Regulating Authority (PCAA), immediately implemented the remedial measures and grounded the Pilot till the blood glucose level returned to normal with proper treatment. With regards to the First Officer, the operator revealed that he had been treated by Dental Surgeon for toothache who prescribed sedative drugs to him. He remained grounded for reason of flight safety and furthermore, referred to the relevant Specialist i.e., Psychiatrist for further necessary opinion inclusive of Psychometric Analysis, Personality Profile and screening of drugs. After the oversight of three months by the Operator as well as Regulating Authority (PCAA), the Medical Board finally declared First officer "FIT' for duty subject to operational multicrew limitations and Issued CAAF-005 accordingly.

2.4.2. The purpose of the use of medicines is to alter perception and this would clearly affect one's ability to make rational and judicious decisions. Therefore, their use should be prohibited before flying and for the amount of time that it would take to fully clear the substance from the body. An individual who appears to meet the criteria for dependence syndrome or harmful use should not undertake safety-critical duties until evaluated by an appropriate specialist. It is also important to consider that the use of many of these substances is illegal in many jurisdictions and therefore using these substances would imply poor judgment on the part of someone who intends to exercise licence or rating privileges. A history of abuse or dependence should be the basis for withholding a Medical Assessment unless there is clear evidence that the condition has been adequately treated and that there is a comprehensive follow-up plan that would uncover any relapses.

2.4.3. During scrutiny of the Amended Guidelines [5] HQCAA, LM No. HQCAA/1141/2/ADAM dated 21st May, 2019 a number of flaws are being observed and it is pertinent to mention so as to clarify and address the issue in the highest interest of PCAA.

2.4.4. It has been reported that some of the operators are devoid of AAMAs (Airline Aviation Medical Advisors) at a number of sectors from where the flights are being operated, inclusive of domestic as well as international routes. Consequently, the aircrew are not being looked/ briefed properly that may have an adverse impact on flight safety.

2.4.5. During in-depth scrutiny of the ANO-002, it has been established that the procedure of breath analyser pre, during and post incident is completely defined. However, for specimen collection part at the lab, the complete details are not being documented. Moreover, there is no defined SOP for sample collection given by PCAA or PAA.

[5] PCAA – LM No. HQCAA/1141/2/ADAM dated 21st May, 2019

SECTION 3 – CONCLUSIONS

3.1. Findings

3.1.1. Prior to flight ABQ-410, at the end of the previous flight bird-strike occurred. The flight crew reported that a bird strike occurred during the flare of the preceding flight. It was confirmed by post-maintenance ground inspection. Engine cleaned with no boroscopic inspection in accordance with AMM 72-00-00-200-006-A task.

3.1.2. At 09:30:18 h, ABQ-410 took-off from AIIAP, Lahore.

3.1.3. Just after Take-off, Pilot reported two “thuds”. ATCO also observed two (02) flames from rear end of the right engine / Engine No.2 during Take-off. ATCO informed Pilot about his observation.

3.1.4. Pilot reported, all engine parameters are normal. however, pilot requested to land back as precautionary measure.

3.1.5. On arrival, Engine No.2 Stall warning reported on PFR.

3.1.6. Borescope Investigation (BSI) of engine No.2 was performed and upon BSI findings the engine declared as unserviceable.

3.1.7. Engine No.2 was dispatched to MRO, SR Technics Switzerland where a Tear down examination was carried out.

3.1.8. Tear down examination revealed bird ingestion at the root of fan blades No.1 to No.34 was observed. A Large quantity of bird remains thru primary flow path. This Impact on VBV doors and misaligned door position. HPC No.1 blade torn and cracked, 02 HPC1 blades torn due to local radial contact and / or bird impact. HPT inspection disclosed contamination.

3.1.9. Approximately after 30 s of full throttle the Pressure Static at Station 3 (PS3) dropped from 400 PSI to 120 PSI, the N1 & N2 and Fuel flow decreased in line with the PS3, and EGT shifted. This is the signature of an engine stall. After 6 s all engine parameters returned to the normal range, in line with the sister engine.

3.1.10. A stall occurs when the compressor operating point and the stall limit are at the same level. This can occur either from a high operating point or from a stall line lower than normal. Thrust lever movements (engine transients) are not the only reason that can affect the stall margin. Other elements can raise the operating line or lower the stall line: distortion, thermal effect.

3.1.11. The bird-strike during the previous flight caused the HPC stage 1 damage, which then reduced the stall line. At T/O thrust the stall margin was reduced. The thermal effect, possibly combined with another transient element (i.e. a distortion peak) consumed the already reduced margin and resulted in the stall.

3.1.12. After the stall, the thermal effect and potential distortion peak went away and the engine recovered the stall and continued to operate as commanded.

3.1.13. It is worth mentioning here, in this region experiences increased rainfall due to the monsoon (rainy) season from mid-June to mid-September, which also coincides with the breeding period of resident species and serves as a source of increased bird activity.

3.1.14. It is crucial for airports authorities to regularly update their bird-strike prevention measures in line with ICAO Doc 9137[6]. Implement advancements in technology and changes in bird behaviour. Additionally, collaboration among local communities, and regulatory authorities is essential to ensuring a comprehensive and effective approach to bird-strike prevention.

3.1.15. Develop and deploy bird deterrent technologies, such as laser systems or sound devices that are safe for both birds and the environment.

3.2. Cause / Contributory Factors

3.2.1. Cause

3.2.1.1. The occurrence is caused due to Bird Strike during the previous flight which resulted, engine to stall and flames were observed during take-off roll.

3.2.2. Contributory Factors

3.2.2.1. The absence of a thorough post-flight inspection following the reported bird strike allowed latent damage to persist, resulting in further deterioration and damage to engine components during the subsequent flight.

Note: Aviation Occurrence Category (ADREP Taxonomy)

Bird (BIRD)

Occurrence involving collision / near collision with bird(s).

[6] ICAO Doc 9137 Chap # 9

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SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. Airblue

4.1.1.1. Maintenance personnel should receive refresher training on bird strike reporting, documentation, and follow-up actions to reinforce safety awareness and compliance.

4.1.1.2. The operator should implement enhanced post-bird-strike inspection checklists, including engine boroscopic examination where applicable, to detect potential internal damage.

4.1.1.3. Conduct routine medical examinations and enforce strict compliance with ICAO and PCAA regulations on fitness-to-fly criteria.

4.1.1.4. Ensure all medical reports and prescriptions are endorsed and documented.

4.1.1.5. Ensure, AAMAs brief in person to the flight crew on any psychoactive medication prescription that may impair cognitive or motor function.

4.1.1.6. Transparent medication disclosure policy without fear of penalization may be introduced.

4.1.1.7. All aircrew must be appreciated for taking right decision for precautionary landing following the engine flame observation.

4.1.2. PAA

4.1.2.1. Further strengthen coordination between PAA and Local Government Authorities to mitigate bird activity around aerodromes.

4.1.2.2. Modern bird deterrent technologies that are environmentally safe may be implement.

4.1.2.3. Standardize procedures for specimen collection, handling of medical tests, storage procedures and chain of custody as defined by PCAA are implemented at all Airports to maintain integrity.

4.1.2.4. All ATCOs must be appreciated at all levels on their vigilance for timely sharing of information of any incidents to aircrew or authorities.

4.1.3. PCAA

4.1.3.1. Ensure post-bird-strike inspections as per aircraft and engine manufacturer guidelines are being compiled by all operators.

4.1.3.2. PCAA may issuing advisory guidance to all Aviation operators emphasizing the importance of prompt BSI and associated documentation following any suspected or reported bird strike.

4.1.3.3. Availability of trained Airline Aviation Medical Advisors (AAMAs) at major Airports by all operators may be ensured.

4.1.3.4. Efforts may be made to train AAMAs from only available Aero Medical Institute in collaboration with PAF or from any renowned institutions' globally to overcome shortage of AAMAs in civil sector in Pakistan.

4.1.3.5. All AAMAs must educate all license holders about the risks of psychoactive substance.