FINAL INVESTIGATION REPORT

SERIOUS INCIDENT

(ENGINE FAILURE ON GROUND)

M/S SKY WINGS PIPER 34-200T AIRCRAFT
REG. NO. AP-BOG AT JIAP, KARACHI ON 23-05-2025

SCOPE

At Bureau of Aircraft Safety Investigation Pakistan (BASIP) investigations are conducted in accordance with Pakistan Aircraft Safety Investigation (PASI) Act 2023, Air Safety Rules 2025 and International Civil Aviation Organization (ICAO) Annex-13.

The sole objective of the investigation and its final report as per above stated regulations is to prevent future accidents / serious incidents / incidents of similar nature without apportion blame or liability. Accordingly, it is inappropriate to use BASIP investigation reports to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for Judiciary and administrative purpose.

This report contains facts, which are based on information which came to the knowledge of BASIP during the investigation up to the time of publication. Such information is published to inform the aviation industry and the public about the general circumstances of civil aviation accidents and incidents.

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ABBREVIATIONS

AAME	Aeromedical Authorized Medical Examiner
ACC	Area Control Centre
APM	Airport Manager
ASF	Airport Security Force
ATC	Air Traffic Controller
ATPL	Air Traffic Pilot License
BASIP	Bureau of Aircraft Safety Investigation Pakistan
CPL	Commercial Pilot License
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
ft	Feet
GA	General Aviation
GMC	Ground Movement Controller
h	Hour(s)
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
IOU	Incident Occurrence and Unserviceability
JIAP	Jinnah International Airport
Kms	Kilometres(s)
kts	Knot(s)
m	Meter(s)
METAR	Meteorological Aerodrome Report
min	minutes
mm	Millimetre(s)
OEM	Original Equipment Manufacturer
OPKC	Karachi
PAA	Pakistan Airports Authority
PASI	Pakistan Air Safety Investigation
PCAA	Pakistan Civil Aviation Authority
R/W	Runway
s	Second(s)
TP	Trainee Pilot
UTC	Universal Time Coordinated

INTRODUCTION

This serious incident was reported to Bureau of Aircraft Safety Investigation Pakistan (BASIP) by Pakistan Airports Authority (PAA) vide Incident Occurrence and Unserviceability (IOU)[1] Report. This serious incident was notified[2] in accordance with International Civil Aviation Organization (ICAO) Annex-13. The investigation has been conducted by BASIP. All corresponding timings are mentioned in Universal Coordinated Time (UTC).

[1] PAA IOU Report dated 23rd May, 2025 – **Appendix 'A'**
[2] Notification to ICAO – **Appendix 'B'**

SYNOPSIS

On 23 May 2025, M/s Sky Wings Piper PA-34-200T aircraft Reg No. AP-BOG experienced No. 1 engine failure during taxi at Jinnah International Airport (JIAP), Karachi. The aircraft was scheduled for a training flight involving circuits and Instrument Landing System (ILS) Approaches on Runway (R/W) 25L at JIAP, Karachi.

The aircraft initially started engines and began taxiing from Hamilton hangar after obtaining start-up clearance. Air Traffic Controller (ATC) cleared the aircraft for ILS Approaches and assigned a transponder code. While holding short of R/W 25L at Taxiway “F”, the pilot requested to return to the hangar. During this process, the pilot reported an engine No. 1 failure and inability to maneuver the aircraft. The aircraft was subsequently shut down on Taxiway “F”, and ground assistance was requested. The aircraft was ultimately towed back to the General Aviation hangar and parked.

SECTION 1 - FACTUAL INFORMATION

1.1. History of the Flight

1.1.1. On 23 May 2025, M/s Sky Wings Piper PA-34-200T Reg. No. AP-BOG experienced No. 1 engine failure during taxi at JIAP, Karachi. The aircraft was scheduled for a training flight involving circuits ILS Approaches on R/W 25L.

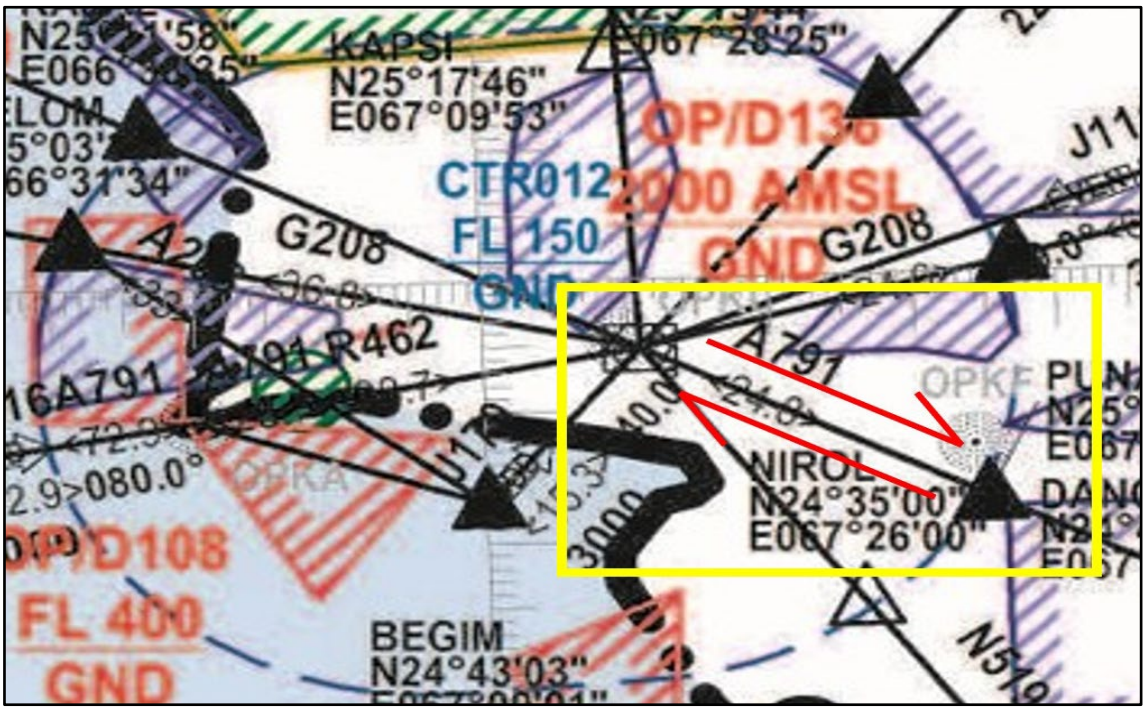

Figure 1 Training Flight Route

1.1.2. Events of flight are as below:

1.1.2.1. **092217** – While taxiing on Taxiway "J", ATC issued clearance for ILS Approaches at 2,000 feet (ft), assigned squawk 1305, and instructed the aircraft to taxi to holding point R/W 25L via taxiways "E" and "F".

1.1.2.2. **093855** – At holding point 25L on Taxiway "F", the pilot requested to return to Hamilton hangar. ATC instructed the aircraft to make 180° turn on Taxiway "F" and proceed back.

1.1.2.3. **094359** – The pilot reported the aircraft was unable to complete the 180° turn and required ground assistance for towing after shutting down engines.

1.1.2.4. **094445** – The pilot reported engine No. 1 failure, requested permission to shut down the remaining engine, and to disembark from the aircraft.

1.1.2.5. **102235** – Ground Movement Controller (GMC) informed the pilot to expect parking in the Night Parking Area.

1.1.2.6. **110334** – On pilot's request, start-up clearance was again issued with all precautions. However, due to a battery issue, engine start was un-successful.

1.1.2.7. **113054** – The pilot requested a tug to tow the aircraft.

1.1.2.8. **122900** – Aircraft was towed from Taxiway "F" to General Aviation hangar.

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 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	03	Nil	03	Nil
Total	**03**	**Nil**	**03**	**Nil**

Table 1 Details of Injuries to Persons On-Board

1.3. Damage to Aircraft

1.3.1. No damages were reported.

1.4. Other Damage

1.4.1. No other damages were reported.

1.5. Personnel Information

1.5.1. Captain along with training pilot (TP) and Flight Safety Officer were onboard the aircraft.

1.6. Aircraft Information

1.6.1. The aircraft was being maintained in accordance with the approved maintenance schedule.

Piper PA-34-200T	
Operator	M/s Sky Wings s
Call Sign	Training Flight
Registration Number	AP-BOG
Sector	Karachi
Aircraft Make & Model	Piper PA-34-200T
Year of manufacturing	1975
Serial Number	34-7570095
Aircraft Hours (h)	9188:41
Engine No.01 (h)	512:32
Engine No.02 (h)	512:32
Propeller (Left side)	55:49
Propeller (Right side)	514:25

Table 2 Aircraft Information

1.7. Meteorological Information

1.7.1. **Meteorological Aerodrome Report (METAR) JIAP, Karachi:** OPKC 230930Z 25007KT 6000 NSC 36/22 Q998 TEMPO 25015 G25KT.

METAR JIAP	
OPKC	**Station ID**: Karachi, Jinnah International Airport
230930Z	**Day** :23 **Time**: 09:30 UTC
25007KT	**Wind Direction**: Wind from 250° (west-southwest) at 7 kts
6000	Visibility is 6,000 meters (m)
NSC	No Significant Clouds
36/22	Temperature: 36°C; Dew point: 22°C
Q998	Altimeter pressure: 998 hPa
TEMPO	Conditions expected to change temporarily within next 2 hours
25015G25KT	**Wind Direction**: Wind from 250° (west-southwest) 15 kts Gusts 25 kts

Table 3 METAR description

1.7.2. At JIAP, Karachi on the 23rd at 0930 UTC, the weather was hot and mostly clear. Winds were blowing from the west-southwest at 7 knots (kts), with occasional temporary increases to 15 kts gusting up to 25 kts. Visibility was good at 6 kilometres (Kms), and no significant clouds were observed in the sky. The temperature was 36°C with a dew point of 22°C, indicating warm and slightly humid conditions. The atmospheric pressure was measured at 999.8 hPa

1.8. Aids to Navigation

1.8.1. Navigational aids for JIAP, Karachi are provided below. At the time of 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 25R	IKC	110.100 MHz	H24	245413.26N 0670835.74E	NIL	NIL
ILS/LOC CAT I 25L	IQA	109.700 MHz	H24	245359.09N 0670820.43E	NIL	NIL
NDB	KC	271.000 kHz	H24	245523.80N 0670936.29E	NIL	Coverage 50NM
DVOR/DME (1°E/2020)	KC	112.100 MHz CH58X	H24	245443.06N 0671053.91E	40.84M	Coverage 200 NM
GP/TDME 25R	IKC	334.400 MHz CH38X	H24	245447.28N 0671029.42E	35.62M	GP 3° RDH 50 FT
GP/TDME 25L	IQA	333.200 MHz CH34X	H24	245433.50N 0671017.88E	30.90M	GP 3° RDH/TCH 55 FT

Table 4 Radio Navigation & Landing Aids JIAP, Karachi

1.9. Communications

1.9.1. Communication frequencies for JIAP, Karachi are provided below. At the time of incident, no abnormality was reported.

Service designation	Call sign	Frequency	Hours of operation	Remarks
1	2	3	4	5
APP	Karachi APP	121.300 MHZ	H24	Secondary
APP	Karachi APP	121.500 MHZ	H24	Emergency
APP	Karachi APP	125.500 MHZ	H24	Primary
ATIS	ATIS	126.700 MHZ	H24	-
BS	Radio Pakistan	830.000 KHZ	HX	0130-1900 HR
BS	Radio Pakistan	1450.000 KHZ	HX	Variable SKED
Apron	Karachi Ground	118.400 MHZ	H24	Secondary
Apron	Karachi Ground	121.600 MHZ	H24	Primary
Apron	Karachi Ground	121.800 MHZ	H24	Vehicle Primary
Apron	Karachi Ground	123.000 MHZ	H24	Vehicle Secondary
TWR	KARACHI Tower	118.300 MHZ	H24	Primary
TWR	KARACHI Tower	118.800 MHZ	H24	Secondary
TWR	KARACHI Tower	121.500 MHZ	H24	Emergency

Table 5 Communication Facilities, JIAP, Karachi

1.10. Aerodrome Information

1.10.1. Aerodrome data of JIAP, Karachi is provided below. At the time of incident, no abnormality was reported.

Designations RWY NR	True bearing	Dimensions of RWY (M)	Strength (PCR) 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
07L	74.29°	3200 x 46	464/R/B/X/U Concrete ACFT upto A310 are permitted	245416.90N 0670851.02E	THR 23.50 M / 77.10 FT	0.200% UP
25R	254.29°	3200 x 46	464/R/B/X/U Concrete ACFT upto A310 are permitted	245444.69N 0671040.84E	THR 30.40 M / 99.74 FT	0.200% Down
07R	74.29°	3400 x 45	1006/R/B/W/U Concrete SWY bitumen	245402.15N 0670833.56E	THR 21.62 M / 70.93 FT	0.168% UP
25L	254.29°	3400 x 45	1006/R/B/W/U Concrete SWY bitumen	245431.79N 0671030.20E	THR 27.25 M / 89.40 FT	0.168% Down

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
100 x 46	Nil	3930 x 300	180 x 120	Nil	NIL	RWY 07L/25R not available for operation from dusk to dawn due to unserviceabale approach & associated RWY lights untill further advise. Arresting barrier at RWY 07L/25R operated for Military traffic only
100 x 46	60	3930 x 300	75 x 120	NIL	NIL	
305 x 45	105	4126 x 300	180 x 120	NIL	NIL	NIL
301 x 45	60	4126 x 300	150 x 150	NIL	NIL	NIL

Table 6 Aerodrome Information – R/W Physical Characteristics JIAP, Karachi

1.11. Flight Recorders

1.11.1. Aircraft is not equipped with Flight Data recorder (FDR), Cockpit Voice Recorder (CVR) and recording device.

1.12. Wreckage and Impact Information

1.12.1. Not Applicable.

1.13. Medical and Pathological Information.

1.13.1. The captain reported for medical after 05 hours and was found medically fit, however, ideal window for toxicology testing is within 02 hours of incident. Trainee student did not report for the medical examination declaring himself as passenger and despite informing he failed to complied statutory and regulatory requirements.

1.14. Fire

1.14.1. There was no fire reported in the incident.

1.15. Survival Aspects

1.15.1. Not Applicable.

1.16. Test and Research

1.16.1. Fuel sample was tested against 100LL specification at Lab and found conforming to specified values in respect of tests carried out.

1.17. Organizational and Management Information

1.17.1. M/s Sky Wings (Pvt.) Limited is a privately owned aviation organization based at JIAP, Karachi, and regulated by the Pakistan Civil Aviation Authority (PCAA). The company conducts flight training and general aviation operations. Strategic oversight is provided by the Board of Directors, with executive management responsible for day-to-day operations and regulatory compliance. Operational control is exercised through designated flight operations, training, engineering, safety, and continuing airworthiness functions, with flight training supervised by the Chief Flying Instructor and aircraft airworthiness managed by the engineering department.

1.17.2. **Training Pilot and Training at M/s Sky Wings –** The trainee pilot during subject investigation was an Ex-Fighter pilot was required to complete minimum training hours for obtaining CPL and Inst Rating on dual engine aircraft. The investigating team did not find any ground training record, cockpit timing or simulator training ~~was~~ available with M/s Sky Wings of Trainee pilot of subject flight and subject flight was his first training flight for circuit and landing.

1.17.3. **Non-Compliance by Training Pilot –** Despite being informed by airside staff, aeromedical officials, and the investigator to report for post-incident medical and toxicology examination, the trainee pilot failed to comply. When contacted personally by the investigator, he was uncooperative, stating that his statement was irrelevant and insisting that only the captain's statement be considered. He later provided only a brief statement via WhatsApp image that the **"engine flamed out when the throttle was brought to idle"**, and declared himself as passenger, although the flight was a scheduled training mission.

1.17.4. Furthermore, despite repeated calls, he failed to appear before the investigation team and remained unavailable for more than three days. M/s Sky Wings also failed to assume responsibility for ensuring his compliance. Due to these violations of PASI Act 2023, Air Safety Rules 2025, and PCAA regulations, PCAA temporarily suspended his training flying on BASIP's recommendation.

1.17.5. **Non-Compliance of Training Standards –** Being the 1st flight, the training pilot seated on the right seat (Instructor Pilot seat) while Captain was on the left seat, contrary to training standard by PCAA.

1.17.6. **Delay in Towing and Lack of Coordination –** The aircraft remained at Taxiway 'F' till 1229 hrs due to non-availability of towing equipment.

1.17.7. Meanwhile, with the support Area Control Centre (ACC) JIAP, Karachi at 1022 hrs a message was conveyed to M/s Sky Wings officials to contact the investigator. However, no response was received from M/s Sky Wings till 1125 hrs. Again, through ACC and Airport Manager (APM), JIAP, Karachi efforts were made in order to reached out the concerned official of M/s Sky Wings and contact was established after an hour.

1.17.8. **Communication with Operator Representatives and Flight Crew –** Following the occurrence, the investigator contacted M/s Sky Wings' Chief Engineer at 1128 hours, who was out of station and unaware of the incident.

1.17.9. At 1138 hours, the captain was contacted and stated that after ground checks, the No.1 engine flamed out when power was brought to idle. He attempted multiple restarts on internal battery power, resulting in battery depletion. He also confirmed that towing arrangements were in progress and that he had been waiting with the aircraft at Taxiway Foxtrot for approximately two hours.

1.17.10. The Operations Manager was then contacted at 1145 hours but was occupied arranging towing equipment and was requested to respond after aircraft parking. However, following aircraft parking, he became non-cooperative when requested to submit aircraft documentation. Despite repeated verbal requests, documentation was not provided. An official request letter was subsequently issued by BASIP; however, M/s Sky Wings officials locked their office and departed without handing over the required documents. The Chief Engineer remained out of station and unaware of the occurrence. Furthermore, in addition to Chief Engineer and Manager operation multiple attempts were also made to contact the CEO, but he remained unreachable and unresponsive till next day.

1.17.11. **Aircraft Recovery –** The aircraft was parked at the CAA hangar at 1252 hours, approximately 3 hours and 18 minutes after the incident. Fuel samples were collected from both wings; however, no fuel sample could be taken from the fuel barrel as it was empty.

1.17.12. **Aircraft Documentation & Non-Compliance by Operator –** Following the aircraft parking at hanger, after gap of 02 hours and 14 minutes at 1506, Operations Manager was again contacted in person by the investigator and directed to submit all aircraft documents and to ensure the training pilot reported for medical examination. He declined to comply. An official request letter was immediately dispatched via email; however, M/s Sky Wings officials locked their offices and left without submitting any documentation.

1.17.13. **Regulatory Intervention –** The matter was escalated to senior management of PCAA, with their intervention, aircraft documents were finally handed over the to the BASIP representative at 1835 hours after gap of 5 hours 43 minutes from parking of aircraft at hanger.

1.17.14. **Non-Cooperation by Operator –** All M/s Sky Wings officials, except the captain, demonstrated non-cooperation by leaving without submitting required documents, failing to respond to repeated investigator calls, and not ensuring the training pilot underwent post-incident medical examination. This resulted in unnecessary delays during the initial phase of the investigation and constituted non-compliance with statutory obligations.

1.17.15. **External Power Start Attempt and Evidence Preservation –** At 1115 hours, an information received by the investigator that another startup attempt had been made using external battery power through jump cables connected to battery of Hiace vehicle. This was corroborated by ATC records at 110334 hours, when the captain requested permission to start up again, which remained unsuccessful. Upon receiving this information, the investigator directed ATC that all further startup attempts be stopped as the investigation team was enroute for evidence collection.

1.17.16. **Medical Record –** Medical records of M/s Sky Wings have been reviewed by the BASIP Investigation Team. During the course of the investigation, it was noted that breath analyzer readings are being captured via screenshot on a mobile phone, then transferred to a computer for printout, and subsequently placed in the medical record folder.

1.17.17. Upon detailed scrutiny, it appears that the medical records may have been tampered with or falsified. In several instances, the pre-flight breath analyzer data either display identical timestamps, lack timestamps altogether, or do not correspond with the relevant flight plan data. Furthermore, the mobile screenshot of the date of occurrence could not be produced, while the corresponding computer printout of the pre-flight data is not available in the medical record folder. However, a copy of this data is reportedly available with the Aeromedical Directorate. These discrepancies raise serious concerns regarding the integrity and authenticity of the documentation. The medical record was sent for analysis to **PCAA Aeromedical Directorate.** PCAA **Aeromedical Directorate** confirmed the tampered or falsified medical records.

1.17.18. **Airline Aviation Medical Advisor (AAMA) –** AAMA engaged by M/s Sky Wings was employed on a contract basis and was simultaneously providing services to **three different organizations.** The AAMA was **not a regular visitor** to the premises of M/s Sky Wings and did not maintain routine operational oversight. It was established that the AAMA had **pre-signed blank breath analyzer forms** and handed them over to M/s Sky Wings. M/s Sky Wings officials subsequently **filled in aircrew credentials themselves** prior to flights without the physical presence of the AAMA. The investigation confirmed that:

1.17.18.1. All breath analyzer tests **were not physically conducted** by the AAMA.

1.17.18.2. Documents presented as medical records were **falsified**.

1.17.18.3. The integrity of medical documentation was **compromised**.

1.17.19. This practice constituted a **direct violation of regulatory requirements** governing: Pre-flight medical fitness, Alcohol testing procedures and authorized medical oversight.

1.17.20. **Airport Security Passes –** During the investigation, one of the delay factors was due to non-availability of security passes with M/s Sky Wings officials. During investigation it was revealed that requisite requests have been forwarded to Airport Security Force (ASF) for complete organization. Had it been in for essential personnel only, ASF might have expedite the issuance of passes subject security clearance which takes considerable time by various agencies. Furthermore, the delays also have been observed in processing timeline of passes at HQ ASF as verification / clearance from security agencies takes considerable time due to large number applicants being processed and wrong credentials filled by applicants.

1.18. Additional Information

1.18.1. **Aircraft Airport Entry Procedure –** The general aviation aircraft at JIAP are housed at PCAA Hanger Complex just on the outside premises of apron area. Due to security reason the following entry procedure is adopted.

1.18.1.1. The GA aircraft start up at the respect hangers in CAA Hanger complex.

1.18.1.2. After complete start up, the aircraft is taxied to ASF entry gate (approx. 300-400 ft distance from hanger to security check post).

1.18.1.3. The aircraft switches off at ASF entry gate. The pilots and passengers off board for physical security check along with physical security check of aircraft is conducted.

1.18.1.4. After security check, the pilots and passengers board the aircraft and carry start-up again and resume taxi.

1.18.1.5. The start-up conducted at ASF entry gate without the availability of Fire extinguisher and fire person thus jeopardizing the flight safety requirement.

1.18.1.6. Moreover, no earthing of aircraft is being conducted.

1.18.1.7. Aircraft are being start-up on internal power only.

1.18.2. During the interviews, with the ASF personnel, this procedure in vogue from last 03 years approximately. Previous procedure was whenever, any General Aviation (GA) flying is schedule, the ASF personnel are detailed for security check of aircraft and personnel at their requisite hangers and complete start up to taxi to ASF entry gate is carried out under the supervision of ASF personnel. During taxi the ASF personnel walk along the aircraft and aircraft continues to taxi without switching off engine.

1.18.3. The aircraft entry procedure adopted is consider a safety hazard as aircraft start-up is conducted without the presence of fire extinguisher and fire personnel. Furthermore, the engine start – stop-start cycle during short span does not cool down the engine for subsequent start-up and engine starting cycles are consumed which require early maintenance and cost to operators.

Figure 2 CAA Hanger Complex

1.19. Use of Effective Investigation Techniques

1.19.1. Not Applicable.

SECTION 2 – ANALYSIS

2.1. General

2.1.1. On 23 May 2025, M/s Sky Wings Piper PA-34-200T (AP-BOG) experienced a No. 1 engine failure during taxi at Jinnah International Airport, Karachi, while preparing for training circuits and ILS Approaches on R/W 25L. The pilot requested to return to the hangar but reported loss of engine power and limited manoeuvrability. The aircraft was shut down on Taxiway "F" and later towed back to the General Aviation hangar.

2.2. Aircraft

2.2.1. Aircraft records and technical documentation were reviewed to identify any previously reported similar occurrences or recent maintenance actions on systems relevant to the event. The review did not reveal any recorded defects, recurring discrepancies, or maintenance activities that could be directly associated with the subject occurrence.

2.2.2. A physical inspection of the aircraft was conducted to identify any observable anomalies, including evidence of fuel or oil leakage, damaged wiring or harnesses, battery-related issues, or any other condition that could have contributed to the reported event. No abnormalities were observed during the inspection, and the aircraft was found to be in a normal external condition.

2.2.3. To preserve the integrity of potential evidence, no components were removed, disconnected, or dismantled during this inspection.

2.3. Duplication of the Event

2.3.1. Following the initial inspection, which revealed no abnormalities, a ground run was conducted by maintenance personnel (using both internal and external batteries) to assess engine performance and attempt to replicate the reported event. The ground run included completion of standard engine ground-run checks as well as the pilot pre-take-off checks. The ground run was completed without any abnormal indications related to the event except for the following observations:

2.3.1.1. RPM hunting was observed at idle during ground run / simulated taxi roll.

2.3.1.2. Left alternator gauge displayed no readings during ground run / taxi roll.

2.3.2. To duplicate the engine shutdown event, a complete ground procedure was simulated at run-up point near M/s Sky Wings hanger by the pilot with investigator on board. During pre-take-off checks simulation, **left engine failed to recover from feathering and eventually it shut down; applying the same feathering pilot checklist procedure on the right engine led to a similar engine shutdown.** However, after a complete switch off both the engines started up normal and ground run was completed.

2.3.3. Subsequently a taxi roll to Taxiway 'F' was carried out to simulate the actual scenario. During pre-take-off checks, at the feathering step, **again the left engine**

could not be de-feathered and subsequently shut down. Attempt to restart the engine was unsuccessful, while the right engine remained in normal operating condition. After a complete shutdown of the aircraft and allowing adequate cooling time for both engines, a restart was attempted; however, it remained unsuccessful. As a result, the aircraft was towed back to the apron for further investigation and maintenance action.

2.3.4. Pilot check list available in the cockpit mentioned to perform the "feathering check" without prompting the pilot to avoid drop in engine RPM more than 300 rotations as mentioned under para-Pre-take-off Check of Operating Instructions of Piper Seneca PA-34-200T revision date March 30, 1977[3]. **This unintentional omission of the prompt put the procedure to be carried out on pilots' memory, experience and training.** During the ground run it was categorically observed that **pilot was more focused on the sound and physical position of propeller and unintentionally less observant of the RPM drop.**

2.3.5. The Piper PA-34-200T is equipped with turbocharged piston engines and hydraulically actuated, constant-speed, full-feathering propellers. According to the Piper PA-34-200T AFM / POH, the feathering check is intended to be a momentary verification of feathering system operation. The procedure requires the propeller control lever to be moved briefly toward the feather position and then immediately returned to the normal operating range to confirm oil pressure response and system functionality. Prolonged movement of the propeller control toward full feather during ground operations is not recommended, as it can result in excessive blade angle, loss of aerodynamic load, and eventual engine shutdown due to insufficient power absorption.

2.4. System Inspection

2.4.1. Aircraft was inspected this time including the unplugging and dismantling of few parts to diagnose the problem.

2.4.1.1. **Harnesses and plugs –** The harnesses and plugs related to the engine start were inspected to identify damages to the shielding or pins of the electrical plugs however all were found normal. Inspection of ignition leads for insulation breakdown, moisture ingress, or high resistance.

2.4.1.2. **Fuel lines and filters –** Fuel lines and filters were inspected to check for leaks and damages however all were serviceable and no fuel contamination was found in the filter.

2.4.1.3. **Oil lines and fittings –** Oil lines and fittings were inspected, since any blockage or leakage could affect engine performance.

2.4.1.4. **Magneto –** Functional checks of both magnetos on each engine were found normal.

[3] Operating Instructions of Piper Seneca PA-34-200T revision date March 30, 1977 **– Appendix 'C'**

2.4.1.5. **Spark Plugs –** The spark plugs of left engine were removed and following anomalies were observed: -

(a) Heavy carbon deposits observed on electrodes of left engine spark plugs. The right engine's spark plugs showed minimal carbon deposits.

Figure 3 Heavy carbon deposits observed on electrodes

(b) Gaps between electrodes of the left engine spark plugs exceeded Original Equipment Manufacturer (OEM) specified limits i.e. specified value is 0.16 – 0.21 millimetres (mm) and were found to be more than 0.22 mm. Same was observed in spark plugs of right engine.

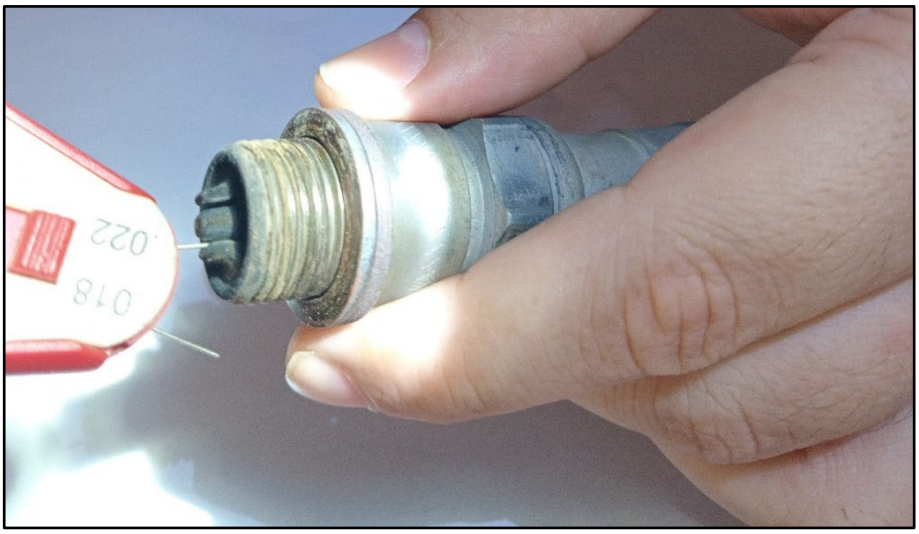

Figure 4 Gaps exceeding OEM-specified limits

(c) According to OEM manuals, spark plugs must be thoroughly cleaned with the specified cleaner and adjustment as per specified values. Copper Gaskets installed with spark plugs are corroded (**Appendix "D"**) and should be replaced as specified by the OEM.

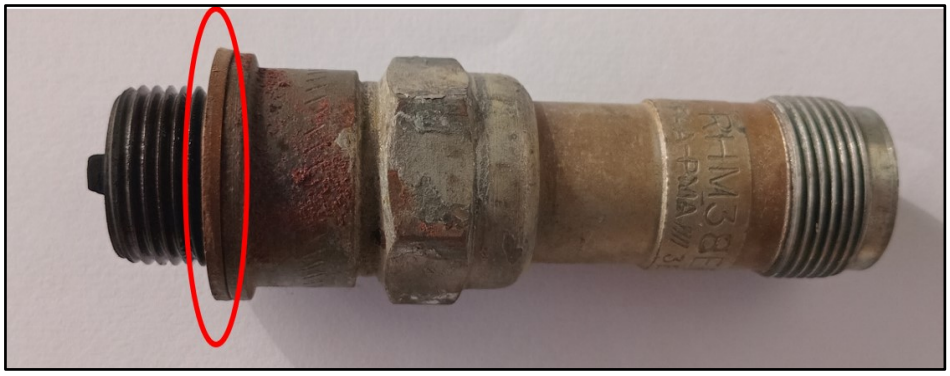

Figure 5 Copper Gaskets installed with spark plugs are corroded

(d) Oil deposits were also observed on the electrode ends of the spark plugs.

Figure 6 Oil deposits observed on the electrode ends

2.4.1.6. **Battery –** Battery was inspected and subjected to load test to verify its integrity and found serviceable.

2.4.2. **Post Analysis.** Based on the event statement and supporting evidence, the occurrence can be characterized as comprising two distinct anomalies:

2.4.2.1. Engine No. 1 shutdown

2.4.2.2. Engine No. 1 failure to start

2.4.3. These two anomalies may have resulted from a single underlying cause or from separate contributing factors, which were subsequently examined during the investigation.

2.4.4. **Engine Inadvertent Shutdown: -**

2.4.4.1. The initial shutdown occurred during taxi while holding short of R/W 25L. Subsequent troubleshooting involved repeated taxi and pre-take-off checks conducted by the same pilot.

2.4.4.2. During these checks, the propeller feathering check was performed by moving the propeller control aft and then forward. On multiple occasions, the affected engine failed to recover RPM and shut down. The same behaviour was later observed on the second engine when the same procedure was applied.

2.4.4.3. Review of the pilot checklist revealed that the time limitation for holding the propeller control in the aft position during the feathering check was not clearly stated. This lack of procedural clarity increased the likelihood of prolonged aft positioning of the propeller control, particularly during low-power ground operations.

2.4.5. Engine Start-up Failure

2.4.5.1. Detailed inspection of the ignition system revealed that the external inspection of the harness and connectors of the system were serviceable. However, following observations are of the spark plug itself:

(b) Spark plug electrode gaps exceeded the manufacturer's specified limits.

(c) Several spark plugs exhibited corrosion.

(d) Oil contamination was present on most of the spark plugs.

2.4.5.2. According to the Piper PA-34-200T AFM/POH and applicable engine manufacturer maintenance instructions, excessive spark plug gap, corrosion, and oil fouling adversely affect ignition efficiency, particularly during engine start when mixture and combustion margins are limited.

2.4.5.3. The presence of oil on the spark plugs is consistent with plug fouling, which can prevent adequate spark generation and lead to failure to start, especially after a hot or abnormal shutdown. The condition of the spark plugs was assessed as pre-existing and not directly caused by the feathering check. This degraded condition, however, significantly reduced the likelihood of a successful engine restart following the abnormal shutdown.

2.5. Operational Analysis – M/s Sky Wings

2.5.1. **Engine shutdown during feathering check –** The investigation established that the No.1 engine shutdown occurred while the flight crew was conducting the propeller feathering check as part of the pre-take off procedure. The feathering check is intended to be a brief and momentary verification of system functionality. However, evidence from crew statements and duplication trials demonstrated that the propeller control lever was held in the feather position for longer than intended period. This resulted in excessive blade pitch angle, loss of aerodynamic load on the propeller, and a subsequent reduction in engine RPM, ultimately leading to engine shutdown. The shutdown was therefore not mechanical in nature but induced by procedural execution.

2.5.2. **Prolonged feathering beyond manufacturer limits –** Manufacturer guidance clearly specifies that the feathering check must only be momentary. During the occurrence flight, this limitation was not adhered to. The prolonged aft positioning

of the propeller control caused oil pressure changes in the propeller governor system, allowing the blades to move towards full feather. This resulted in a condition where the engine was no longer able to sustain combustion due to insufficient load, causing the engine to flame out.

2.5.3. **Checklist deficiencies –** The cockpit checklist used by the crew did not specify a time limit or RPM reduction threshold for conducting the feathering check. The absence of this critical guidance placed reliance on pilot memory, experience, and interpretation. This design deficiency increased the probability of procedural misapplication, especially during training flights where variations in technique are more likely to occur.

2.5.4. **Successful duplication of event –** During post-occurrence ground runs, the event was successfully duplicated when the same pilot applied identical feathering technique. The engines shut down again when the propeller control was held in the feather position for longer than intended duration. When the procedure was performed momentarily, no abnormal behaviour was observed. This duplication confirmed that the occurrence was procedural rather than mechanical.

2.5.5. **Training pilot refusal of medical examination –** Following the occurrence, the trainee pilot refused to report for mandatory post-incident medical and toxicology examination. Despite being repeatedly instructed by BASIP investigators, aeromedical staff, and airside officials, he declined compliance and declared himself a passenger, although the mission was his scheduled training flight. This conduct constituted a violation of PASI Act 2023 and ICAO Annex-13 obligations to cooperate with safety investigations.

2.6. Medical Examination Analysis

2.6.1. **Captain:** Post-occurrence medical testing was delayed by approximately five hours due to expired airside passes of maintenance staff, lack of serviceable towing equipment, and absence of on-site laboratory facilities, necessitating off-airport transportation for sample collection.

2.6.2. **Trainee Pilot:** Despite repeated formal instructions, the trainee pilot failed to report for medical examination, refused compliance when contacted, misrepresented his status as a passenger, and ignored statutory obligations under the Pakistan Air Safety Investigation Act, 2023. This deliberate non-cooperation led to temporary suspension of his flying privileges by PCAA on BASIP's recommendation.

2.7. Organizational Factors

2.7.1. M/s Sky Wings

2.7.1.1. Review of maintenance records did not reveal deferred defects or recent maintenance actions directly associated with the occurrence. Initial external inspections and ground runs indicated that the engines were capable of normal operation under certain conditions.

2.7.1.2. However, the **non-availability** of spark plugs, cleaning of spark plugs and gap-adjustment tools at the flight line **limited the ability of maintenance personnel** to maintain the part as per the manufacturer specifications.

2.7.1.3. The spark plug condition suggests that the spark plug anomaly was a latent technical condition which remained undetected until combined with an operational trigger i.e. feathering-induced shutdown.

2.7.1.4. Interviews were planned after the event of Captain, Trainee and the third passenger at the Investigation facility close to the site. Post-occurrence interviews could not be conducted as planned due to the nonavailability of the Captain, whose phone remained switched off for over eight hours and was not available at his residence. Additionally, M/s Sky Wings lacked documented next-of-kin details for its employees, indicating inadequate personnel record management.

2.7.1.5. At the time of the occurrence, employees of M/s Sky Wings had **not received their monthly salaries for the preceding three months**, indicating financial and administrative constraints within the organization, which may have adversely affected staff morale, operational discipline, and safety culture.

2.7.1.6. **Airlines Aviation Medical Advisor (AAMA) –** The contractual arrangement of the AAMA, coupled with the non-payment of salary for an extended period, created a conflict of interest and significantly reduced professional accountability. The AAMA's absence from routine operations resulted in a lack of direct supervision of mandatory pre-flight medical checks. The practice of pre-signing blank breath analyzer forms constituted a serious ethical breach and a deliberate circumvention of established safety controls. Allowing company officials to independently complete medical documentation eliminated independent medical verification, enabled manipulation of safety records, and undermined regulatory compliance.

2.7.1.7. Furthermore, the falsification of medical records concealed the actual medical status of flight crew, created a false assurance of fitness to fly, and introduced systemic safety risks into flight operations. This practice demonstrated a clear breakdown of safety governance, reflecting weak internal controls, an ineffective compliance culture, and management tolerance of unsafe practices.

2.7.1.8. **Poor document control systems –** M/s Sky Wings demonstrated inadequate document control, evidenced by withholding of aircraft documents, Inconsistent record keeping, lack of electronic backups and locked offices during investigation. PCAA audits did not effectively evaluated document traceability, retention policies, or accessibility protocols. Proper regulatory oversight should verify document management systems to ensure accountability and traceability.

2.8. Human Factors

2.8.1. Checklist Design and Human Factors

2.8.1.1. The investigation determined that the pilot conducted the pre-takeoff checks in accordance with the checklist available in the cockpit. However, the checklist itself lacked sufficient procedural clarity regarding the feathering check. Specifically, it did not prescribe a maximum duration or RPM reduction limit for holding the propeller control in the feather position.

2.8.1.2. This omission increased reliance on the pilot's personal judgment, experience, and interpretation of the procedure. In a training environment, where techniques may vary, such reliance significantly elevates the risk of procedural misapplication. As a result, the pilot inadvertently held the propeller control longer than intended, leading to excessive blade pitch angle and subsequent engine shutdown.

2.8.1.3. There was no evidence to suggest any improper intent, negligence, or deliberate deviation from standard operating procedures. The pilot acted in good faith, believing he was correctly executing the checklist. The occurrence therefore reflects procedural design weakness rather than individual failure.

2.8.1.4. **Maintenance Tooling Deficiency**

(a) The investigation identified that appropriate maintenance tooling for spark plug inspection, cleaning, and calibration was not available at the flight line. This deficiency prevented ground crew from performing maintenance tasks in accordance with OEM requirements.

(b) As a result, spark plugs remained in a degraded condition, exhibiting carbon deposits, corrosion, oil fouling, and excessive electrode gaps. These deficiencies adversely affected ignition performance and contributed to the inability to restart the engine after shutdown.

(c) The poor maintenance outcome was not attributable to negligence or improper intent on the part of the ground crew. Instead, it was a direct consequence of the operator's failure to provide essential tools and resources required for proper maintenance. This reflects an organizational deficiency in maintenance support infrastructure.

2.8.1.5. **Supervisory and Safety Management Failures**

(a) The investigation established that the supervisory management of M/s Sky Wings failed to effectively implement regulatory and Safety Management System (SMS) requirements.

(b) Key supervisory positions, including: Chief Executive Officer (CEO), Chief Flying Instructor (CFI), Chief Engineer (CE), Quality Manager, Operations Manager and Administrative Manager did not exercise adequate oversight over operational, maintenance, and administrative functions. An effective safety governance structure should have identified: Absence of training records, deficiencies in maintenance tooling, Fraudulent medical documentation, Non-compliance with investigation

requirements and weak safety reporting culture well before the occurrence. The absence of coordinated supervisory oversight reflects a systemic breakdown in safety governance, directly contributing to the unsafe conditions that existed prior to the event.

2.9. ASF Security Procedures vs Aircraft Safety

2.9.1. **Unsafe start–stop security model –** Current ASF procedures require aircraft to start engines at hangar, taxi to the security gate, shut down engines for inspection, and then restart. This practice introduces multiple safety hazards, including:

2.9.1.1. Absence of fire crew during restart.

2.9.1.2. No fire extinguishers.

2.9.1.3. No aircraft earthing.

2.9.1.4. Increased hot-start risk.

2.9.1.5. Battery drain and starter motor stress.

2.9.1.6. Thermal stress on engine components.

2.9.2. **Comparison with previous safer practice –** Previously, 03 year back ASF conducted security checks at the hangar and ASF officials walk along the aircraft, allowing aircraft to taxi continuously without shutdown. This practice significantly reduced operational risk. The revised procedure prioritizes security at the expense of aviation safety and violates basic ground handling risk management principles.

2.10. Safety Outcome and Preventive Aspect

2.10.1. Although classified as a serious ground occurrence, the investigation concluded that this event inadvertently prevented a potentially catastrophic airborne accident.

2.10.2. **Had the engine shutdown occurred after takeoff, the aircraft would have been exposed to: Asymmetric thrust, Reduced climb performance, Increased pilot workload and Elevated risk of loss of control.**

2.10.3. This ground-based nature of the event allowed safe containment and investigation without injury or damage. In this regard, the occurrence served as a critical safety barrier, exposing systemic weaknesses before they could manifest in a far more severe in-flight emergency.

2.10.4. This event therefore highlights the importance of robust safety systems, proactive oversight, and effective regulatory surveillance to prevent escalation into fatal accidents.

2.11. Regulatory Oversight – PCAA

2.11.1. Regulatory Oversight failed to detect critical deficiencies at M/s Sky Wings, including missing employee biodata, incomplete trainee pilot training records,

inadequate maintenance tooling, improper cockpit seating practices, and maintenance of fraudulent medical documentation. Additionally, the operator's Safety Management System (SMS) was ineffective, reflecting a compliance-focused audit approach rather than proactive, performance-based safety oversight.

SECTION 3 – CONCLUSIONS

3.1. Findings

3.1.1. Operational Findings

3.1.1.1. The Piper PA-34-200T (AP-BOG) experienced a No.1 engine shutdown during taxi at Jinnah International Airport while preparing for a scheduled training sortie involving circuits and ILS approaches on R/W 25L

3.1.1.2. The shutdown occurred during pre-take-off checks, specifically while conducting the propeller feathering check

3.1.1.3. The pilot followed the checklist available in the cockpit; however, the checklist did not specify a time limit or RPM reduction threshold for holding the propeller control in the feather position

3.1.1.4. During the duplication of the event, ground run by maintenance crew were normal with no observations related to the event. However, ground run and subsequent taxi roll by the same pilot of the occurrence day resulted in the duplication of event due to propeller feathering procedure applied by same aircrew (slightly prolonged) which caused engine to shut down.

3.1.1.5. Attempts to restart the engine after shutdown were unsuccessful during the duplication ground requiring aircraft towing to the hangar.

3.1.2. Technical Findings

3.1.2.1. Initial aircraft inspection revealed no external anomalies, fuel or oil leaks, or battery-related issues.

3.1.2.2. Detailed inspection revealed **significant spark plug degradation** on the left engine:

(a) Heavy carbon deposits on electrodes

(b) Electrode gaps exceeding OEM limits (>0.22 mm, spec: 0.16–0.21 mm)

(c) Corroded copper gaskets

(d) Oil contamination on electrode ends

3.1.2.3. The right engine spark plugs exhibited minor carbon deposits and similar gap exceedances.

3.1.2.4. Fuel lines, filters, ignition leads, harnesses, and magnetos were serviceable.

3.1.2.5. Spark plug condition was assessed as **pre-existing**, not caused by the feathering check, but **significantly degraded ignition performance**, especially during hot or abnormal restarts.

3.1.3. Organizational Findings

3.1.3.1. Maintenance records did not indicate deferred defects or recent maintenance relevant to the event.

3.1.3.2. The flight line lacked appropriate spark plug inspection, cleaning of spark plugs, and adjustment tools, limiting compliance with OEM specifications.

3.1.3.3. This tooling deficiency prevented maintenance personnel from **complying with OEM requirements**.

3.1.3.4. Operator management failed to cooperate with investigators, withheld documents and locked offices and failure to comply to statuary obligations.

3.1.3.5. Original mobile screenshots and electronic medical records of the breath analyzer tests were not shared with the investigation team; instead, only printed hard copies pre-signed by the Aeromedical Authorized Medical Examiner (AAMA) were provided, which were later confirmed to be fraudulent by the PCAA Aeromedical Directorate. The breath analyzer reports for the subject flight did not correspond with actual flight plans, and the trainee pilot was not subjected to breath analysis prior to the flight.

3.1.3.6. Upon detailed scrutiny, of last six-month data it appears that medical records have been tampered with or falsified. In several instances, the pre-flight breath analyzer data either display identical timestamps, lack timestamps altogether, or do not correspond with the relevant flight plan data.

3.1.3.7. Furthermore, it was revealed that M/s Sky Wings employed the AAMA on a contractual basis, who simultaneously provided services to multiple organizations and was not regularly present at the operator's facility. The AAMA pre-signed blank medical forms, which were subsequently used by company officials, while breath analyzer tests were not physically conducted by the AAMA and were falsely documented as completed. Medical documentation submitted to investigators was fraudulent, and the concerned operators' officials knowingly facilitated the falsification of records. Additionally, the non-payment of salary to the AAMA compromised his professional independence and professional accountability, further undermining the integrity of the aeromedical oversight system.

3.1.3.8. The captain reported for post-occurrence medical examination approximately five hours after the event, contrary to prescribed procedures requiring immediate medical and toxicological assessment. The delay resulted from operational and logistical constraints, including unavailability of valid airside passes for maintenance staff, lack of serviceable towing equipment, absence of on-site laboratory support at the airport, and transportation time to an approved external facility for sample collection.

3.1.3.9. The trainee pilot refused post-incident medical and toxicology testing, violating statuary obligations.

3.1.3.10. Airport security procedures forced multiple engine start–stop cycles for GA aircraft without fire cover or earthing, creating serious ground safety hazards

3.1.3.11. Regulatory Oversight failed to detect critical deficiencies at M/s Sky Wings, including missing employee biodata, incomplete trainee pilot training records, inadequate maintenance tooling, improper cockpit seating practices, and maintenance of fraudulent medical documentation and ineffective SMS implementation

3.1.3.12. This occurrence functioned as a critical safety barrier, preventing escalation into a potentially catastrophic airborne asymmetric thrust event. It exposed systemic organizational and regulatory deficiencies while still on ground phase, providing a valuable opportunity for preventive safety intervention. The above recommendations aim to convert this near-miss into long-term safety resilience through strengthened oversight, procedural compliance, and proactive risk management.

3.2. Causes / Contributing Factors

3.2.1. Cause

3.2.1.1. The No. 1 engine shutdown was primarily caused as a result of **longer than intended period** of propeller feathering during pre-take-off checks, which removed aerodynamic load and resulted in engine flame-out. The inability to restart was **pre-existing spark plugs degradation** (carbon deposits, corrosion, oil fouling and excessive gap), which reduced ignition efficiency.

3.2.2. Contributing Factors

3.2.2.1. **Checklist inadequacy.** This improper feathering resulted from a **procedural design deficiency** in the cockpit checklist. The checklist used by the flight crew **did not specify any time limitation or permissible RPM reduction** for conducting the feathering check. The absence of this critical guidance placed undue reliance on the pilot's **memory, experience, and personal interpretation** of the procedure.

3.2.2.2. **Maintenance Infrastructure Deficiency:** Lack of proper tools prevented maintenance staff from correcting spark plug defects as per OEM standards**.**

3.2.2.3. **Human Factors:** Pilot relied on sound and visual cues rather than RPM monitoring due to checklist design limitations.

3.2.2.4. **Organizational Failures:** Weak SMS, poor document control, uncooperative management and lack of compliance culture

3.2.2.5. **Medical Governance Failure.** Fraudulent medical documentation of breath analysis undermined flight safety assurance**.**

3.2.2.6. **Unsafe ASF Security Procedure.** Mandatory engine shutdown and restart at security gate without fire protection increased engine stress and risk.

Note: Aviation Occurrence Category (ADREP Taxonomy)

- ***Loss of control–ground (LOC–G)***
  - *Loss of control due to System / Component Failure (Powerplant) (SCF–PP) – Engine malfunctions affecting taxi, takeoff roll, or landing roll.*

SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. M/s Sky Wings

4.1.1.1. Revise the aircraft pre-take-off checklist to explicitly include the maximum duration for the feathering check to prevent inadvertent engine shutdown in coordination with OEM and PCAA.

4.1.1.2. Ensure availability of appropriate spark plug inspection, cleaning, and calibrated tools at the flight line, in compliance with OEM maintenance manuals.

4.1.1.3. Implement a recurring maintenance inspection program for spark plugs, focusing on electrode condition, gap measurement, corrosion, and oil fouling.

4.1.1.4. Provide recurrent pilot training emphasizing feathering check procedures, RPM monitoring, and awareness of operational hazards associated with prolonged feathering during ground operations.

4.1.1.5. Maintain updated next-of-kin records for all employees and trainees for utilization during any contingencies.

4.1.1.6. Immediately discontinue the use of pre-signed medical forms and ensure physical presence of the AAMA during flying operations.

4.1.1.7. Undertaking from all trainee pilots to be embed in the training contract to comply by all statuary and regulatory requirements.

4.1.1.8. Ensuring PCAA-approved breath analyzer procedures and electronic record integrity.

4.1.1.9. Ensure timely payment of employee salaries and strengthen financial governance to support staff welfare, maintain morale, and promote a strong safety culture essential for safe operations.

4.1.2. Airport Security Force.

4.1.2.1. Review and revise security procedures in collaboration with PCAA and PAA to eliminate mandatory engine shutdown and restart at security gates. Where unavoidable, ensure fire cover, trained personnel, and firefighting equipment are available.

4.1.3. Pakistan Civil Aviation Authority

4.1.3.1. Review and issue guidance on standardization of feathering check procedures and checklist clarity for multi-engine piston Piper aircraft.

4.1.3.2. Ensure that operators to maintain adequate tooling and infrastructure for critical maintenance tasks in line with OEM specifications. The tools record on loan basis from other AMOs need to be maintained by all operators as in this case no documentation of handing / taking over was found / maintained by M/s Sky Wings. Moreover, the during the QA sessions with the aircrew, the left engine starting problem persisted over the period and was verbally communicated to maintenance personnel

however, no entries were made on tech log due various compulsions with in the organization.

4.1.3.3. Further strengthen the oversight mechanism on General Aviation Operators.

(a) Conduct spot checks for all operators to determine how various procedures have been adopted in their respective domains and their compliance with regulatory rules. Defaulters (if any) may be dealt with existing regulatory rules.

(b) Ensure that spot checks are designed not only to verify compliance by operator but also to improve upon any regulatory deficiencies or shortcomings in current regulatory procedures and policies.

4.1.3.4. Regulate and prohibit unsafe engine shutdown practices through directives, audits, and enforcement in line with ICAO standards and manufacturer guidance.

4.1.3.5. All non-compliance of M/s Sky Wings and trainee pilot are to be endorsed in PCAA record.

4.1.4. Piper Aircraft Inc (Manufacturer)

4.1.4.1. Piper Aircraft Inc. is recommended to **issue an advisory notice or Service Bulletin** to further refine and standardize the propeller feathering procedure within the aircraft checklist. The guidance should clearly specify:

(a) Maximum permissible feathering duration.

(b) Acceptable RPM reduction limits.

(c) Mandatory RPM monitoring during the procedure.