Civil Aviation Authority
Sri Lanka

Safe Skies for All

FINAL REPORT

Aircraft Incident of Sakurai Aviation Academy,
Piper PA 38-112 Tomahawk, bearing registration no 4R-ASJ, emergency landing at Payagala Beach, Kaluthara, Sri Lanka on 22nd December 2021

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LIST OF ABBREVIATIONS AND ACRONYMS

AASL	-	Airport and Aviation Services (Sri Lanka) Limited
ADC	-	Air Defence Clearance
ADC&CC	-	Air Defence Command & Control Centre
AIP	-	Aeronautical Information Publication
AJTL	-	Aircraft Journey and Technical Logs
AMC	-	Acceptable Means of Compliance
AME	-	Aircraft Maintenance Engineer
AMO	-	Approved Maintenance Organization
ANR	-	Air Navigation Regulations
approx.	-	approximately
ATC	-	Air Traffic Control
ATO	-	Approved Training Organization
CAASL	-	Civil Aviation Authority of Sri Lanka
CAM	-	Continuing Airworthiness Manager
CAME	-	Continuing Airworthiness Management Exposition
CAMO	-	Continuing Airworthiness Management Organization
CFI	-	Chief Flight Instructor
CPC	-	Ceylon Petroleum Corporation
CRS	-	Certification for Release to Service
DDG/FSR	-	Deputy Director General/Flight Safety Regulations
DGCA	-	Director General of Civil Aviation
ENR	-	Enroute
Ft	-	Feet
GPS	-	Global Positioning System
HOQ	-	Head of Quality
hrs	-	hours
IS	-	Implementing Standard
ITI	-	Industrial Technology Institute
Km	-	Kilometers
Kts	-	Knots
LT	-	Local Time
MM	-	Maintenance Manual
MSN	-	Manufacturers Serial Number
MOE	-	Maintenance Organization Exposition
NDB	-	Non-Directional Beacon
NM	-	Nautical Miles
NTSB	-	National Transportation Safety Board
PA	-	Piper Aircraft
PIC	-	Pilot in Command
POB	-	Passengers on Board
POH	-	Pilot's Operating Handbook
PPL	-	Private Pilot Licence

RPM	-	Revolution per minute
SCT	-	Scattered
SLAF	-	Sri Lanka Air Force
SLST	-	Sri Lanka Standard Time
S/N	-	Serial Number
S/W	-	Surface Wind
TAPM	-	Training and Procedures Manual
TSO	-	Time since overhaul
UTC	-	Coordinated Universal Time
VCCC	-	Colombo International Airport, Ratmalana, Sri Lanka
VCCK	-	Koggala Airport, Sri Lanka
VCCN	-	Katukurunda Airport, Sri Lanka
VFR	-	Visual Flight Rules
VOR	-	Very High Frequency Omni-Directional Range

Aircraft Incident of Sakurai Aviation Academy, Piper PA 38-112 Tomahawk, bearing registration no 4R-ASJ, emergency landing at Payagala Beach, Kaluthara, Sri Lanka on 22nd Dec 2021

INTRODUCTION

Sakurai Aviation Academy is a flight training organization licensed by the Director General of Civil Aviation for the provision of pilot training, which is based at Colombo International Airport, Ratmalana.

The Occurrence was notified to DGCA - Sri Lanka by Sakurai Aviation Academy on 22nd Dec 2021 through a telephone call. Upon the initial notification, the DGCA instructed DDG/FSR to immediately dispatch a team of CAASL Inspectors to the site at the Payagala Beach (6°32'11.6"N 79°58'19.6"E) located in southwest coastal area in Sri Lanka.

The occurrence was categorized as an 'incident' in accordance with the ICAO taxonomy and investigation was initiated by an investigation team of the CAASL. Subsequently, an aircraft Incident Report Form was submitted by the Training Organization.

The Investigation Team notified the National Transportation Safety Board (NTSB) of United States of America, being the State of Manufacturer and the State of Design. The NTSB appointed an Investigator as an accredited representative and a technical advisor from the Manufacturer, Piper Aircraft.

SYNOPSIS

A training flight (Piper PA -38-112, bearing Registration 4R-ASJ) of the Sakurai Aviation Academy was planned to carry out a solo cross country navigation flight on 22nd December 2021 from Colombo International Airport, Ratmalana (VCCC) to Dondra (5.9320° N, 80.5911° E), and to carry out "touch and go" with circuits at Koggala Airport (VCCK) and Katukurunda Airport (VCCN) as per the flight plan. The estimated take-off time was 1115hrs. (LT) whereas the departure had been delayed.

The aircraft had departed at approx.1305 hrs. (LT) from runway 04 at VCCC. After passing abeam VCCN the aircraft had encountered engine RPM drop during cruise, over the southwest of VCCN and subsequently, an emergency landing had been carried out at Payagala beach (6°32'11.6"N 79°58'19.6"E), Kaluthara, Sri Lanka.

OBJECTIVE

The objective of this investigation is to identify the probable cause(s) and issue safety recommendations to prevent recurrence of similar incidents.

1 FACTUAL INFORMATION

Training Organization	:	Sakurai Aviation Academy No, 118, Airport Road, Ratmalana, Sri Lanka
Registered Owner	:	Sakurai Aviation Ltd
Aircraft Make	:	Piper Aircraft Corporation
Aircraft Model	:	Piper PA -38-112 Tomahawk
MSN	:	38-78A0022
Aircraft Nationality	:	Sri Lanka (4R)
Aircraft Registration	:	4R-ASJ
Persons On Board (POB)	:	02 (Pilot in Command and Other occupant)
Place of Incident	:	Payagala Beach, Kaluthara, Sri Lanka
Type of Operation	:	Training
Date and Time	:	22nd Dec 2021; approx.1332hrs (LT) /0802 UTC
Local time zone	:	+ 0530hrs

1.1 History of Flight

Piper PA 38- 112 aircraft (belongs to the Training Organization, bearing Nationality Mark and Registration Number 4R-ASJ) had departed approx. at 1305hrs (LT) on 22nd December 2021 for a solo training cross country navigation flight to Dondra. The flight was planned to overfly Dondra at 3500ft and to carry out "touch and go" with circuits at VCCK and VCCN and to operate within 05NM to 15NM south of VCCC and to carryout circuits.

The VCCC Control Tower had cleared the flight to proceed to Dondra at 1500ft. When the aircraft was passing the "Kalu Ganga" (River), ATC control had transferred to the VCCN Tower. While maintaining cruise altitude at 1500ft, the aircraft had encountered an engine RPM drop over the southwest of VCCN.

Although the flight had been planned as solo, there were two persons onboard including the PIC. As per the statements, the other occupant who was onboard with the PIC had declared "MAYDAY" at approx. 1000ft at 1330hrs (LT). At this time the Katukurunda Air Traffic Control Tower had cleared the aircraft to join the left base for Runway 29 of VCCN for emergency landing.

The other occupant had informed the ATC Tower that they were unable to make it to the runway. Subsequently, the PIC had carried out the emergency landing at Payagala beach approx. at 1332hrs (LT).

Figure 01: Flight Path

1.2 Injuries to Persons:

No Injuries.

1.3 Damage to Aircraft:

There was no extensive damage to the aircraft, except the damage on the aircraft left main wheel assembly. As the left main wheel had hit a reef during landing, it was found with a big hole on the outer side wall of the tyre and the wheel hub was found with an impact damage.

Figure 02: Presence of a reef

Figure 03: 4R-ASJ, Propeller front view

Figure 04: Position of the aircraft after landing

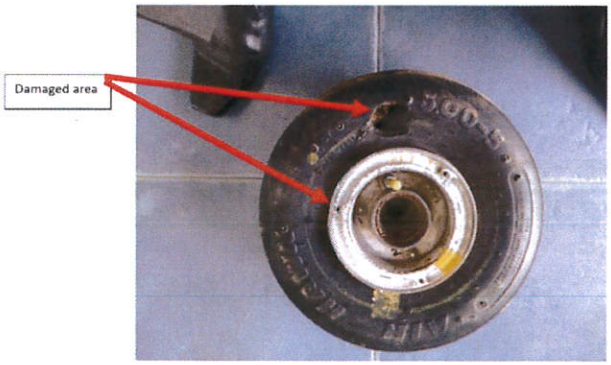


Figure 05: Left main wheel

1.4 Other damage:

There was no other damage.

1.5 Personnel Information:

1.5.1 Flight Crew (Pilot-In-Command)

Licence	:	PPL (CAASL-72-A-10351) issued by the DGCA - Sri Lanka and valid till 30th Nov 2023
Medical	:	valid till 23rd October 2022
Age and gender	:	20 years, Male
Aircraft Ratings	:	Single Engine Piston (Land)
Flying Experience (hrs)	:	Total on type: 53.9 hrs

1.5.2 Other occupant

Licence	:	PPL (CAASL-72-A-10355) issued by the DGCA - Sri Lanka and valid till 30th April 2023
Medical	:	valid till 18th November 2022
Age and gender	:	25 years, Male
Aircraft Ratings	:	Single Engine Piston (Land)
Flying Experience	:	Total on type: 50.8 hrs

1.6 Aircraft Information

Type and Model	:	Piper PA38-112 Tomahawk	
Year of Manufacture	:	1978	
Manufacturer's Serial No	:	38-78A0022	
Certificate of Registration	:	No 323, Registered in Sri Lanka Civil Aircraft Register and valid till 01st Jan 2023	
Certificate of Airworthiness	:	No 277, Issued by the CAASL and valid till 10th March 2022.	
Total Airframe Hours	:	8824.7 hrs as at 22nd Dec 2021 before this particular flight	
Engine	:	Single Engine	
		Model :	Lycoming O-235-L2C
		Serial Number:	RL-15116-15
		Total Cycles:	N/A
		Total Hours:	155.3 (TSO) *as at 21.12.2021*
		Fitted on:	18th Oct 2021
Propeller		Model:	Sensenich 72CK-0-56
		Serial Number:	K 6660
		Total Cycles:	N/A
		Total Hours:	477 (TSO) *as at 21.12.2021*
		Fitted on:	27th Jan 2021
Type of fuel used	:	AVGAS 100LL	
Type of engine oil used	:	Aeroshell W100	
Fuel capacity	:	114L	
Weight & Balance	:	There was no evidence on weight & balance calculations.	

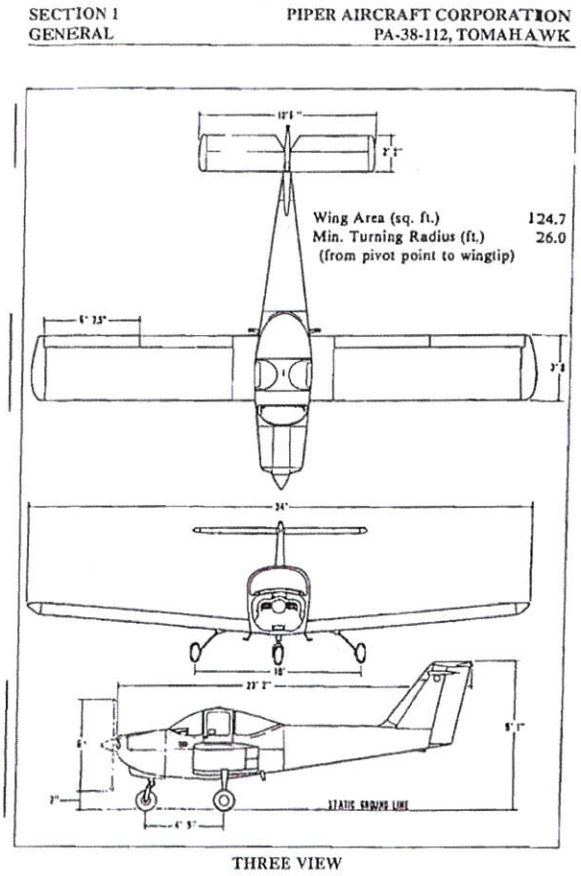


Figure 06: 4R- ASJ three view layout (PA 38 – POH)

1.7 Meteorological Information:

As per records from VCCN ATC Tower at the time of the incident, the meteorological information was as follows;

Surface Wind	:	270^0 05Kts
Visibility	:	6 -7 Km
Weather	:	Partially Cloudy
Clouds SCT	:	2000ft
Temperature	:	31^0 C
QNH	:	1011 Hpa

1.8 Aids to Navigation:

In this particular navigation route there were no navigational aids used by civil flights such as VOR, NDB and other aids. This Flight was operated through Visual Flight Rules using ground aids.

1.9 Communication:

The flight was transferred to the VCCN ATC Tower by the VCCC ATC Tower prior to the incident crossing "Kalu Ganga" river. Communication was with the VCCN ATC Tower at the time of the incident.

Time (Local Time)	Station	Frequency (MHz)
1305hrs to 1327hrs	VCCC Tower	119.100
1327hrs to 1337hrs	VCCN Tower	118.400

1.10 Aerodrome information/Landing area:

The aircraft had carried out an emergency landing at the Payagala Beach located in Kaluthara District, in south west coastal line of Sri Lanka, which is a sandy, soggy surface with a slight sloping angle.

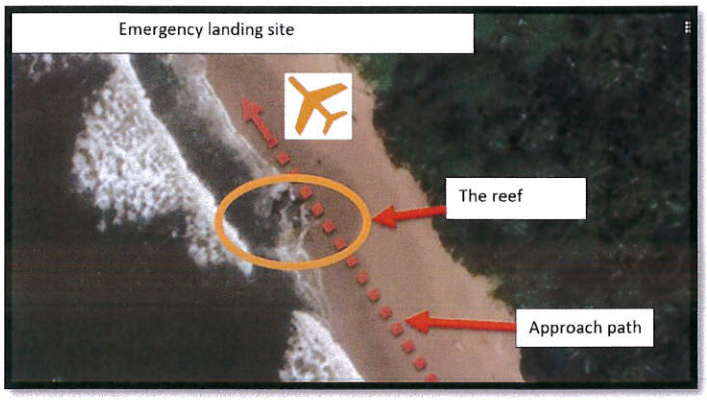


Figure 07: Landing area at Payagala Beach

1.11 Flight Recorders:

Not Applicable

1.12 Wreckage and impact information:

Not Applicable

1.13 Survival aspects:

Not Applicable

1.14 Test and Research:

On-site inspection at Payagala beach was carried out by CAASL Inspectors shortly after the incident including aircraft controls, engine controls movements and fuel quantity check.

1.14.1 Fuel Sampling Test

The fuel sampling tests were conducted by Ceylon Petroleum Cooperation of Sri Lanka (CPC) and Industrial Technology Institute (ITI) of Sri Lanka to verify the contamination and standards of the fuel used.

1.14.2 Inspections and tests

The inspection of engine (S/N: RL-15116-15) and relevant component checks were carried during the post incident inspections by the Investigation Team. The fuel system was also inspected and examined. After sharing the outcome of the checks/tests with the Accredited Representative of NTSB and engine manufacturer Lycoming, four engine ground runs were carried out on 4R-ASJ, as per PA-38-112 -POH under the direct observation of the Investigation team.

1.14.3 A study on factors contributing to Engine RPM drop

A study was carried out reviewing other Investigation Reports published in respect of similar incidents. There were several factors reviewed during the study that could have contributed to the engine RPM drop. An engine RPM drop could have been due to defect/s of the engine, its associated components, fuel or fuel system components and also failure of engine controls.

Also studied possible impact due to weather conditions at the time of incident, in case where the temperature and the dew point conducive to formation of ice in the carburetor at cruise.

The classic symptoms of carb ice are, reduced power and a rough-running of engine. As per the manufactures guidance, aircraft fitted with fixed pitch propellers, the first indication of carb ice is typically a small decrease in RPM.

In addition to the above, the possibility of vapor lock which may have led to the engine power loss was also considered during the study.

1.15 Organizational and Management Information:

1.15.1 The Training Organization

Sakurai Aviation Academy is a CAASL Approved Training Organization with approved post holders namely the Accountable Manager (AM), Head of Training (HOT), Chief Flight Instructor (CFI), Safety Manager, Chief Theoretical Knowledge Instructor (CTKI) and Compliance Monitoring Manager (CMM).

The initial ATO certificate was issued to the Training Organization on 17th August 2017 and renewed annually. At the time of the incident the Training Organization was operating with two PA-38-112 and a Cessna 172 aircraft.

A review of the PA-38-112 check list issued by the Training Organization to Instructors and the students, found to be inadequate and not in compliance with respect to the check list information contained in the Piper Tomahawk Pilot's Operating Handbook (POH) issued by the Aircraft Manufacturer.

The PIC, other occupant and the CFI had acted in a manner not complying with the Regulation 240(a) of ANR 1955 and the requirements specified in the CAASL approved TAPM.

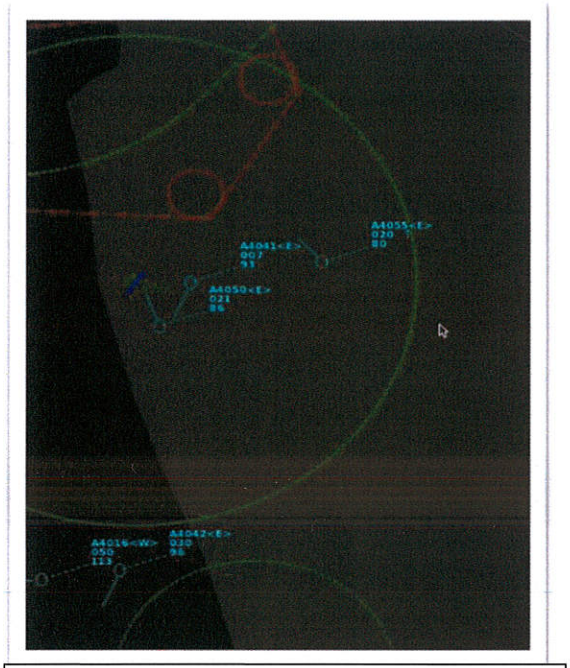
Non-adherence to the approved management policies, procedures and standard practices have jeopardized the safety culture of the Training Organization.

1.16 Additional Information:

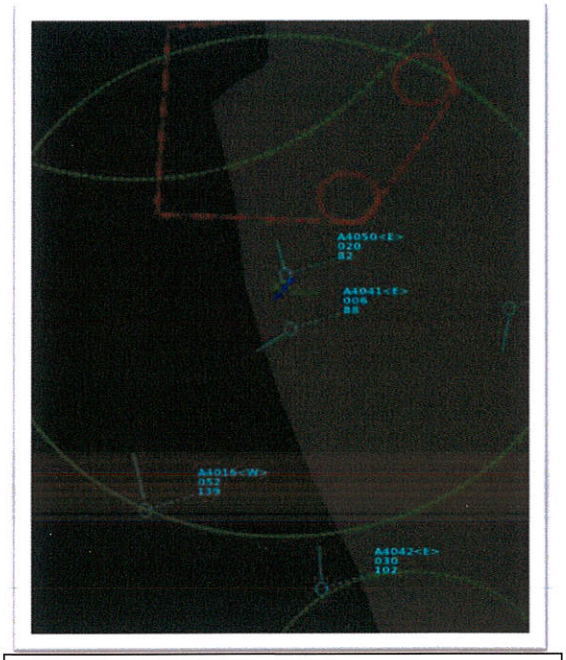
Nil

1.17 Useful or Effective Investigation Techniques:

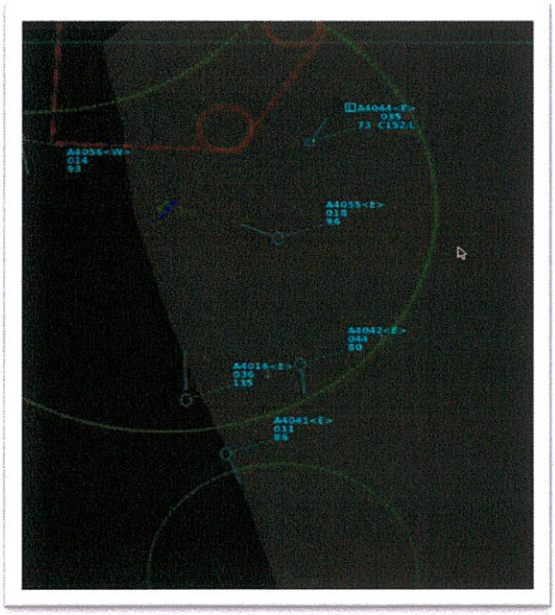
As an useful investigation technique, radar images were superimposed with the Radio calls recorded with VCCC and VCCN. The flight path was simulated and found the flight time, directions and the speeds were tallying as per the statements provided by the PIC and the other occupant.



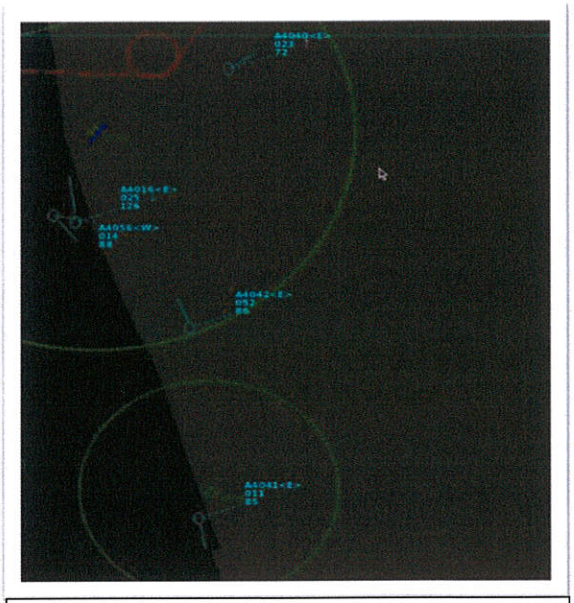
01-*Climbing off from Runway 04 of VCCC at 700 feet and 93 Kts, joining the right downwind at the end of the crosswind.*



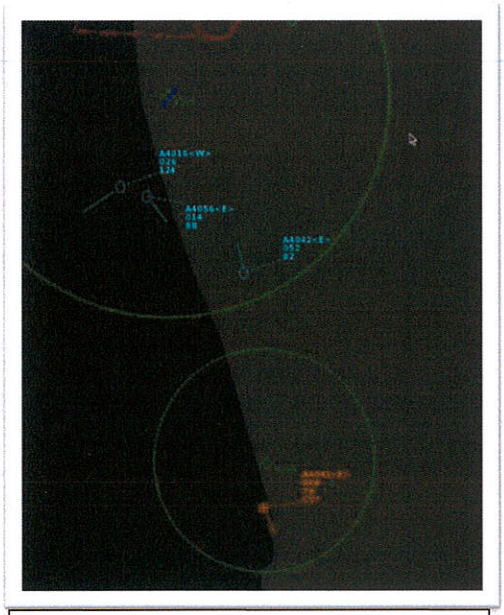
02. Climbing at a speed of 88 Kts at 600 feet in right downwind area south of VCCC.



03. Cruising along the coast line towards south of VCCC at a height of 1100 ft and at a speed of 86 Kts.



04. Encountering the power loss passing VCCN at the height 1100 feet and speed of 85 Kts.



05. The last blip of the 4R-ASJ indicating in red colour at 700 feet and the speed of 78 Kts south west of VCCN.

Figure 08: five Radar Images of the flight

2 ANALYSIS

2.1 Flight Documents

The Investigation Team observed following fundamental discrepancies in legal flight documents during the investigation.

1) ATC flight plan was filed on the same day, with the name of the PIC of the incident flight and Persons on Board (POB) had marked as "001" (ONE) (refer Appendix 01). However, there were two persons on board the incident flight, which is not in compliance with the planned solo flight.
2) Pursuant to paragraph 2.3.1 of ENR 2.2 on "Other Regulated Airspaces" published in the AIP of Sri Lanka, the Training Organization had submitted ADC Request Forms on 22nd Dec 2021 twice and noted below,
    - The POB in both ADC Request Forms, were marked as "02" (TWO).
    - The names of the PIC and the other occupant were included under crew details (as crew) on the ADC Request Forms.
    - The other occupant's name had been entered as a "Pilot" in both ADC Request Forms.

Having observed the above facts, it was confirmed that the Training Organization had disseminated an incorrect /false information to the ATC Tower and ADC&CC of SLAF.

2.2 Pre-flight check

The PIC is responsible to carry out preflight checks as per PA 38-112 POH. During the investigation, the PIC stated that he had carried out the pre-flight checks except the fuel drain. However the fuel drain is a part of preflight checks, which is required to be carried out prior to each flight by the PIC, as per the PA-38-112- POH.

2.3 Weight and Balance analysis

There were no evidence on weight & balance calculations were done by the PIC, prior to the flight.

The weight & balance calculations were carried out by the Investigation team, using the basic empty weight of the aircraft 4R-ASJ, total fuel as per the technical log and the body weights of both occupants.

As per the weight and balance graph, loaded moment remained within the given limit of Centre of Gravity (CG) by the Manufacturer. However, it was observed that the aircraft was overloaded since the total weight exceeds the Maximum Take-Off Weight (MTOW) by 41 Lbs. (Refer Appendix: 08)

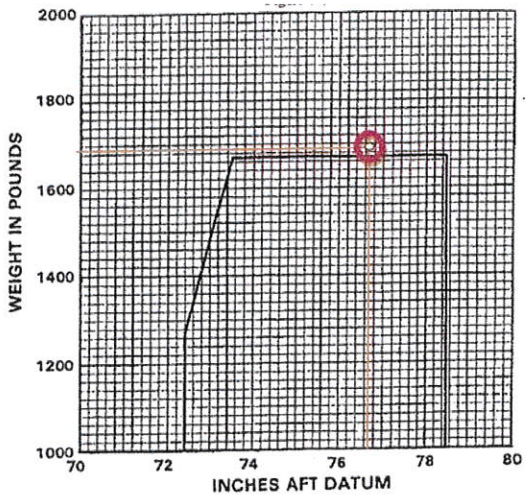


Figure 9: Weight / Balance chart

2.4 Incident flight

As per the Statements of the PIC and the other occupant, during cruise about 5-6 NM out of VCCN air field, they had felt sinking of the aircraft and noticed a drop in engine RPM around 800. Subsequently, they had attempted to recover the engine RPM, using the throttle and it had not been successful. According to the statements, the aircraft had been trimmed to 70 Knots as per PA 38 check list and managed to carry out emergency landing at Payagala beach.

According to the statements, it was evident that the PIC had not carried out the required emergency procedure checks applicable for Engine power loss in-flight as per PA 38 POH.

It was recorded that there were contradictory statements given by the PIC and the other occupant during three interviews held by the investigation team. By analyzing this, it was revealed that the actual status of the engine RPM was really unknown at the time the emergency landing was performed.

Further, it was revealed that the PIC had not carried out crash landing checks, shut down checks and emergency evacuation checks as per POH during the final phase and landing of the flight.

Figure 10: Distance from landing site to VCCN

The distance from the landing site to VCCN air field was approx. 1.08NM as measured by the GPS coordinates. As per the glide path and the radar image, the approx. distance to the VCCN air field from the point where the engine RPM drop identified was approx. 1.2 NM.

Hence, if the PIC had been closely monitoring the engine instruments continuously, he might have identified the engine RPM drop at the initial stage. Furthermore, if he had taken a timely decision, he could have carried out emergency landing at VCCN air field instead of Payagala beach, subject to the prevailing wind conditions.

It was evident that there could have been a high possibility of monitoring aircraft instruments more vigilantly and closely by the PIC, if he was flying solo and this scenario could have been different.

2.5 PIC's training

According to the Training Records submitted by the Training Organization, the PIC had been trained on PPL exercises. However, as per the statements of the PIC, he had not carried out the relevant emergency checks according to the POH. If the PIC had carried out required checks as per POH, he would have restored the engine RPM at the given circumstances.

2.6 Other occupant

As per the interviews and ATC transcripts, it was evident that the communication with VCCN ATC Tower and the navigation during the emergency were handled by the other occupant including the "MAY DAY" call.

2.7 The Training Flight - Solo cross-country

The Sakurai Aviation Academy had scheduled & planned a solo cross-country flight to Dondra.

It was revealed that the other occupant (A PPL holder of the same Training Organization) had obtained permission from the CFI to join this solo cross-country flight. The CFI had authorized his request by releasing the Flight Authorization Sheet (refer Appendix 04). However, the Head of Training stated during the investigation that he had not been informed about such an arrangement.

Furthermore, the PIC and the other occupant stated that they both had flown on 20th Dec 2021 (Two days prior to this incident) on a flight to south of VCCC which had also been declared as a solo flight, with the authorization of the same CFI (refer Appendix 05).

As per the TAPM, there are two types of training flights, solo and dual training flights. In a dual training flight, a flight instructor should accompany a student, whereas a solo flight shall be carried out only as the sole occupant of the aircraft. Hence the other occupant who flew with the PIC on these two particular flights, do not fall into either of the above types.

With reference to solo flight, the DGCA had issued instructions to all ATOs on "Logging of hours flown solo by a student pilot" via a letter ref DG/16/1/12 (CA/21/304) dated on 14th October 2021. It was confirmed and verified that the instructions were received by the Training Organization prior to the incident. However, there was no evidence on dissemination of such instructions among the students.

Furthermore, the CFI who had authorized above mentioned flights (20th and 22nd December 2021), PIC and the other occupant on both flights did not comply with the Regulation 240(a) of ANR of 1955.

2.8 Safety Culture of the Training Organization

In view of all the above facts and evidences, it was evident that the Accountable Manager who was held responsible to the DGCA for the compliance to all applicable Rules, Regulations and Implementing Standards through an accepted SMS, had not complied with the Regulation 240(a) of ANR of 1955. This concludes the lack of discipline and poor level of safety culture throughout the Training Organization.

2.9 Detailed Examination

2.9.1 Engine:

During the engine examination it was observed the free rotation of the engine and also there was no evidence of the engine had seized. Engine was an overhauled unit which was installed recently. There were no previous defects reported after the engine installation as per the maintenance records/ log books.

Below inspections, tests & checks were conducted by a subject matter expert and a qualified member in the Investigation Team as per the Manufacturer's instructions.

- The engine cylinder boroscope inspection
- Cylinder compression
- Magneto to engine timing
- Valve clearance limits
- The spark plug condition and serviceability tests in a pressurized test chamber.

The results of the above inspections & checks were satisfactory to the Investigation Team and was shared with the NTSB and Engine Manufacturer for technical advice.

As per their opinion, the first engine ground run was performed on 02nd Feb 2022 as per the PA 38-112 POH by an independent Flight Instructor under the direct observation of the Investigation Team. Subsequently, there were three engine ground runs carried out. The engine behavior, performance and parameters were found satisfactory.

2.9.2 Aircraft and Fuel System:

The operation of the flight controls and engine controls on airframe side were found satisfactory.

A thorough examination of the fuel system was carried out including fuel tank and fuel lines. Both fuel tanks were found with no debris. The filters at the tank outlets and the gascolator were clear of any debris. There was no leakage and blockage in the fuel system and the fuel selector valve operation was found satisfactory.

The electrical fuel pump operation was normal. The function of the carburetor heat flap was normal and the air intake filter was clean.

Figure 11: cockpit layout of 4R-ASJ, Piper PA38-112 Tomahawk

Therefore, it was not possible to conclude that the engine and the fuel system were the causes for the drop in engine RPM in this incident flight.

2.10 Aircraft documentation

2.10.1 Aircraft Journey and Technical Log

The Investigation team reviewed all aircraft documents related to approved AMO and CAMO.

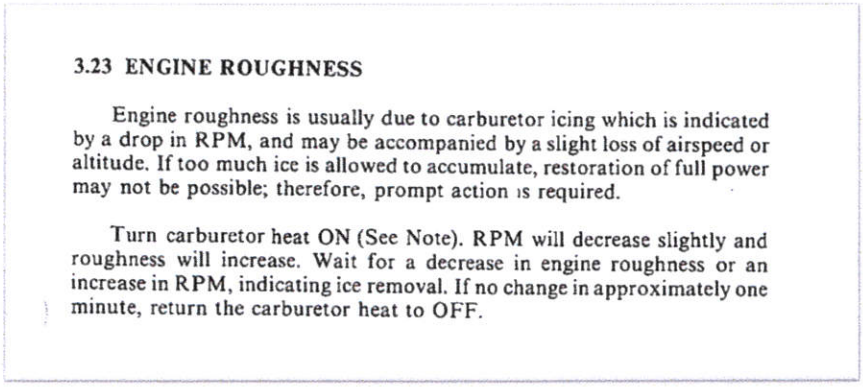
On the day of the incident, a daily inspection was carried out by an authorized AME and there were no defects recorded in the "Aircraft Journey and Technical Log" (AJTL). The Pilot has accepted the aircraft by signing the AJTL.

As part of the investigation, 30 (thirty) numbers of AJTLs were sampled dating back to 22nd December 2021. The samples were reviewed and found that the AJTL pages were sequentially numbered and the hours to the next maintenance check were consistent with the hours recorded against each flight. However, it was noticed that in three occasions there were incomplete data in AJTLs.

2.10.2 PA – 38- Pilot's Operating Handbook

The Sakurai Aviation Academy had used a separate aircraft check list, which is an extract from the POH. However, the mandatory information including emergency checks applicable for the particular incident were not captured. As a result, the actions to be taken during the engine RPM drop had not been mentioned in the said aircraft checklist, which is stipulated in Section 3.23 of PA -38-112–POH. This revealed, that the Training Organization had not highlighted the

importance of the use of POH, the Manufacturer recommended and approved document. Which is also a requirement as stipulated in the Section 2.3.2 of TAPM of the Training Organization.



3.23 ENGINE ROUGHNESS

Engine roughness is usually due to carburetor icing which is indicated by a drop in RPM, and may be accompanied by a slight loss of airspeed or altitude. If too much ice is allowed to accumulate, restoration of full power may not be possible; therefore, prompt action is required.

Turn carburetor heat ON (See Note). RPM will decrease slightly and roughness will increase. Wait for a decrease in engine roughness or an increase in RPM, indicating ice removal. If no change in approximately one minute, return the carburetor heat to OFF.

Figure 12: Section 3 of Emergency Procedures of PA -38 –POH

Analyzing all evidences and the Statements of the PIC & the other occupant, it was evident that the lack of knowledge of aircraft POH, poor situational awareness and inability to take prompt actions appropriate to the situation are the contributing factors.

Hence, this incident could have been averted, if the drop in engine RPM and the engine roughness were observed and identified at the initial stage, and subsequent prompt action carried out as per the PA-38- 112 POH.

2.11 Aviation Fuel

This aircraft had used the Avgas 100LL, Type of fuel approved by the engine manufacturer.

2.11.1 Testing of Fuel:

The following fuel samples were tested as part of the investigation.

- A sample taken from the right & left tanks of 4R-ASJ
- A sample taken from the Fuel Cart which had delivered 100LL

The fuel samples were tested by two independent facilities. The tests established that the fuel samples taken from the Fuel Cart and 4R-ASJ Left & Right wing tanks were in conform to the requirements for Aviation Gasoline Grade Avgas 100LL.

2.12 Technical assistance from the NTSB and Lycoming

After reviewing the results of all above tests & inspections, NTSB and the engine manufacturer were in the opinion that defect or malfunction in aircraft engine itself was very unlikely to contribute to this incident. Further clarification was obtained from them to determine other contributing factors which may have affected this incident, including loosening and disengaging

the throttle cable from the carburetor during the flight due to vibration. In such instances, as confirmed by the Engine manufacturer, an engine would remain at the same power setting as it was at before.

2.13 Vapor Lock

Vapor lock is a condition in which AVGAS vaporizes in the fuel line or other components between the fuel tank and the carburetor. This can be caused by excessively hot fuel, low pressure, or excessive turbulence of the fuel travelling through the fuel system on aircraft with engine-driven fuel pumps

Due to contradictory statements of both PIC and the other occupant, it was evident that they had no idea about the exact point of the engine stopping whether it was inflight or after landing.

Therefore, it could not be completely eliminated that there was no vapor lock in the fuel lines or other component between the fuel tank and the carburetor.

2.14 Carburetor icing

Carburetor icing occurs as a result of vaporization of fuel and a reduction in pressure as the fuel & air mixture passes through the venturi in the carburetor. These effects cause a drop in the temperature which, if it falls below the dew or freezing point of water, will result in ice forming on the sidewalls and the butterfly valve in the carburetor. As the ice builds up, it gradually blocks the venturi and alters the fuel / air balance which causes the engine to run roughly and lose power.

Carb icing is not restricted to cold weather. It could occur even on warm days if humidity is high, especially at low power settings.

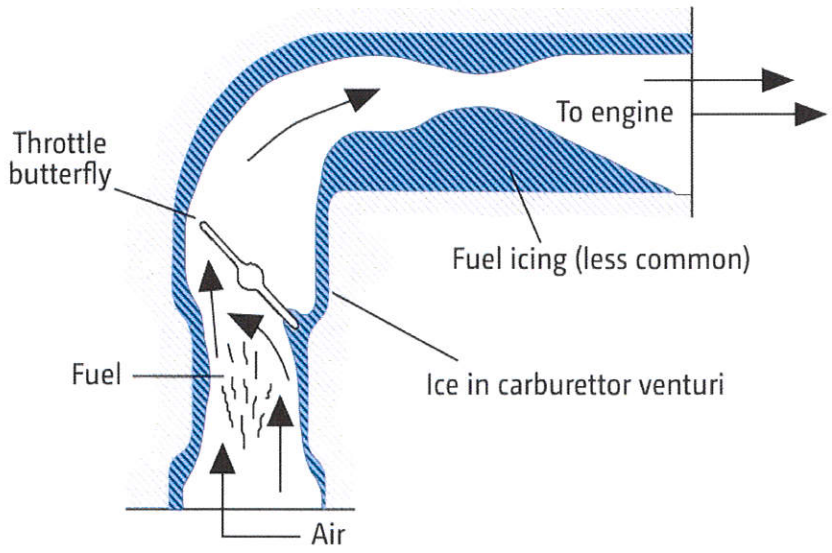


Figure 13: The formation of carburetor ice may reduce or block fuel – air - flow to the engine

The below table was constructed by interpolating the available weather information received from Meteorological Department of Sri Lanka. The relevant temperature and dew points were derived from the closest Weather Station which is Agalawatte, Kaluthara District in Sri Lanka. Further the aerodrome weather at VCCN observed by the ATC Tower and the transcript of the Radio Telephony conversations at VCCN at the time of the incident were obtained.

Time of Observation	Ratmalana		Agalawatte		Galle	
Local (SLST)	Temp Dry (°C)	Dew Point (°C)	Temp Dry (°C)	Dew Point (°C)	Temp Dry (°C)	Dew Point (°C)
11.30	31.6	22.9	**29.5**	**25.3**	28.7	25.5
14.30	31.1	24.1	**31**	**25.1**	29.5	25.3
15.30	**30.1**	**24**	30.3	24.5	**29**	**25.3**
17.30	29.1	23.9	**28.9**	**24.8**	28.4	25.3

(Interpolated values – in green colour; actual values- in black colour)

Below chart illustrates the combinations of atmospheric temperatures and dew points where there is a risk of carburetor icing.

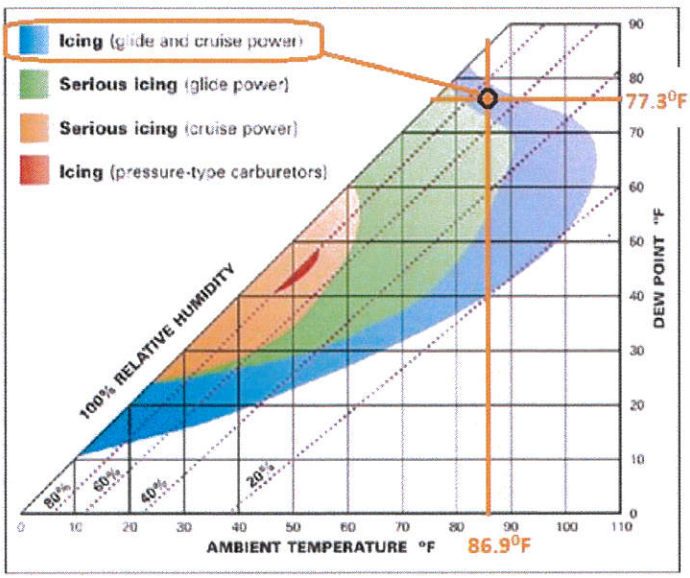


Figure 14: Carburetor icing chart (source: Special Airworthiness Information Bulletin on Carburetor Icing Prevention ref: CE-09-35 dated 06th June 2009 issued by Federal Aviation Administration.)

At the time of this incident, the interpolated temperature and the dew point were 30.5 °C (86.9 ºF) and 25.16 °C (77.29 °F) respectively. In these conditions, there was a possibility of carburetor icing at glide and cruise power settings.

Hence, in the absence of the conclusive evidences to identify any defect on the engine, fuel or fuel system components and failure of engine controls for RPM drop and based on the available facts, other evidences and statements, it can be determined the formation of carburetor icing was one of the probable cause for this incident.

Further, the lack of knowledge of the PIC, in using carburetor heat during engine RPM drop as per the POH and also subsequent failure of the engine power restoration when throttle was advanced by the PIC were considered by the investigation team that there was a possibility on the formation of Ice in the carburetor at the time of the incident

3 CONCLUSION

3.1 Observations

a) The aircraft had a valid certificate of airworthiness and a valid certificate of Registration.
b) The Training Organization had a valid Flying School Licence issued by the DGCA.
c) The aircraft was maintained by an approved AMO and CAMO.
d) The AMO and CAMO of the Training Organization had valid CAASL approvals.
e) The PIC had a valid PPL licence issued by the DGCA.
f) As per the Training Records, the PIC had trained on all PPL exercises.
g) The other occupant was a student of the same Training Organization, who had a valid PPL issued by the DGCA.
h) The Head of Training of the ATO was appointed on 11th April 2019 and he was appointed as the Accountable Manager on 22nd Jan 2021 in addition to the responsibilities given as the Head of Training.
i) The Accountable Manager of the ATO was the Accountable Manager for both Sakurai Aviation AMO and CAMO.
j) The Chief Flight Instructor was initially appointed on 6th June 2019.
k) Further the Accountable Manager of the Training Organization was the the Head of Training of the Training Organization.
l) The aircraft engine had been replaced with a new overhauled engine recently.
m) The aircraft was airworthy when dispatched for the flight.
n) The other occupant had handled the ATC communication at the time of the emergency and declared "MAYDAY".
o) There was no evidence of any prior defect or malfunction in the aircraft systems or engine that could have contributed to the incident.
p) There were no defects or malfunctions found in the engine during post engine run.
q) The quality of the fuel samples was at the proper grade and found no contamination.

3.2 Findings

3.2.1 PIC

a) The PIC did not comply with Regulation 240(a) of ANR of 1955 by carrying a person on a practice flight for the issue of a pilot's licence on 20th Dec 2021 and 22nd Dec 2021.
b) The PIC did not comply with the requirements stipulated in paragraph 3.16 (1) of Chapter 3 of TAPM of the Training Organization.
c) The PIC was not aware of the instructions issued by the DGCA on "Logging of hours flown solo by a student pilot" through a letter reference DG/16/1/12(CA/21/304) dated 14th October 2021.
d) During the investigation, PIC admitted that he was not familiar with the ATC flight plan.
e) There was no evidence that the PIC had calculated the weight & balance prior to the flight.
f) It was unable to conclude that the PIC had been monitoring the engine instruments continuously as per recorded evidence.
g) The PIC's statements verified that his overall knowledge and understanding of the PA38-POH, especially on handling of engine RPM loss and impact on carburetor icing are inadequate.
h) The PIC had not placed the control to set the carburetor heat "ON" during engine RPM drop as per the recorded evidence.
i) The PIC had not carried out the crash landing checks, shut down checks and emergency evacuation checks as per POH during final phase and landing of the flight as per the recorded evidence.
j) PIC has admitted that he did not follow the aircraft checklist during emergency.

3.2.2 Other occupant

a) The other occupant being a PPL holder did not comply with the regulatory requirements stipulated in Regulation 240(a) of ANR of 1955 by requesting permission from CFI and joining on solo flights conducted on 20th Dec 2021 and on 22nd Dec 2021
b) He did not comply with the requirements stipulated in Paragraph 3.16 (1) of Chapter 3 of TAPM of the Training Organization.
c) He was not aware of the instructions issued by the DGCA on "Logging of hours flown solo by a student pilot" through a letter reference DG/16/1/12(CA/21/304) dated 14th October 2021.
d) His overall knowledge and understanding of the POH, especially on handling of engine RPM loss and impact on carburetor icing are inadequate.

3.2.3 Accountable Manager of the Training Organization

a) The Accountable Manager who has the ultimate authority over the safe operation of the organization and who has committed for compliance with all applicable regulatory requirements through an accepted SMS as per the Implementing Standard 070, did not ensure the compliance with the ANR of 1955 throughout the Organization.

b) The Accountable Manager did not fulfill his responsibilities mentioned in paragraph 1.8.1.3 of Chapter 1 of TAPM.

3.2.4 Head of Training of the Training Organization

a) He did not ensure the compliance with Regulation 240 (a) of ANR of 1955 by the students, instructors and CFI.
b) The Head of Training did not fulfil his responsibilities stipulated under paragraph 1.8.1.2 of Chapter 1 of Training and Procedure Manual of Sakurai Aviation Academy and Section AMC1 ORA. ATO. 110(b) of Implementing Standard 067 issued by the DGCA.
c) He had not ensured proper dissemination and compliances with the instructions issued by the DGCA on "Logging of hours flown solo by a student pilot" through a letter Ref DG/16/1/12(CA/21/304) dated 14th October 2021.
d) Head of Training did not verify and certify the contents of the 4R-ASJ aircraft check list which had extracted from the PA-38- 112 POH.
e) Head of Training had allowed instructors and students to use a non-standard checklist (above "d") during flights.

3.2.5 Chief Flight Instructor of the Training Organization

a) The CFI did not comply with Regulation 240(a) of ANR of 1955 and Paragraph 3.16 (1) of Chapter 3 of TAPM of the Training Organization by authorizing the PIC to carry a person on practice flights for the issue of a pilot's licence on 22nd Dec 2022.
b) The CFI did not comply with Regulation 240(a) of ANR of 1955, by authorizing the same PIC to carry a person (the same student) on practice flights for the issue of a pilot's licence on 20th Dec 2021.
c) The CFI did not fulfil the responsibilities stipulated in paragraph 1.8.1.5 of Chapter 1 of the TAPM.
d) The CFI did not adhere the instructions issued by the DGCA on "Logging of hours flown solo by a student pilot" through a letter Ref DG/16/1/12(CA/21/304) dated 14th October 2021.
e) As per the statements and facts disclosed during the investigation interviews of two PPL holders involved in this incident revealed that the CFI had not provided required training for the students including POH checks and procedures on handling of abnormal situation specifically on engine RPM drop and using carb heat.

3.2.6 The Training Organization

a) There was a discrepancy in the POB mentioned in the ATC Flight Plan and ADC Request forms.
b) Incorrect information on POB had been submitted to the ATC tower.

c) It was found that the aircraft was overloaded since the total weight exceeds the Maximum Take-Off Weight (MTOW) as per the calculation carried out by the Investigation Team.
d) The other occupant's name had been entered as a "Pilot" in ADC Request Forms.
e) There was no evidence on dissemination of instructions issued by the DGCA on "Logging of hours flown solo by a student pilot" through a letter Ref DG/16/1/12 dated 14th October 2021.
f) There was no evidence that the fuel drain had been carried out by the students as per pre-flight checks.
g) There was no evidence that the carburetor icing conditions & resulted engine RPM drop and remedial action during such situations were covered and briefed during training sessions.
h) The aircraft check list extracted from the PA-38-112 POH by the Training Organization, had not included information and checks to be carried out in case of engine RPM drop and during engine roughness.
i) Some areas of the check list mentioned above (h), is illegible and contained alterations (refer Appendix 10).
j) The PA- 38 POH which was on board 4R-ASJ, found not divided into numbered Sections with a "finger-tip" tab divider for quick reference as per Introduction of Section 1 of the POH.
k) There was no evidence that the Training Organization had monitored the compliance to the procedures stipulated in TAPM on pre-flight preparation by the students.
l) There was no evidence in the Technical Logbook to verify the engineer certifications (CRS) are issued before pilots' acceptance except for the first flight of the day.
m) No evidence found in the Technical logbook to verify whether the pilots have carried out the pre-flight checks as per the relevant POH prior to sign & accept of each flight.
n) There was no evidence to conclude that the internal quality and safety measures committed in CAASL approved manuals have been reviewed and proper action has been taken throughout the Organization.
o) It was found that the required knowledge transferring to the students by the Flight & Ground Instructors was inadequate.

3.2.7 The AMO of the Sakurai Aviation Ltd

a) There were three AJTLS with incomplete data raised by AME.
b) There was no evidence on presence of the effective quality system within the AMO.
c) There were non-standard maintenance activities found and recorded during the investigation.
d) Post holders competency in respective subject matters were inadequate.

3.2.8 The CAMO of the Sakurai Aviation Ltd

a) There was no evidence on instructions issued for completion of AJTLs.
b) There was no evidence on the presence of the effective quality system within the CAMO.
c) There were non-standard practices recorded during the investigation.
d) Post holders competency in respective subject matters were inadequate.

3.2.9 Weather

a) The atmospheric conditions on the incident day was favorable for carburetor icing.

3.3 Probable causes

According to the weather data analysis, post incident checks and tests, the carburetor icing or vapor lock could be the causes for the engine RPM drop.

However due to the contradictory statements given by the PIC and other occupant it was difficult to conclude the exact cause.

3.4 Contributory Factors

The following were determined as contributory factors,

a) PIC's
   - inability to monitor & identify the engine RPM drop & engine roughness at the initial stage;
   - inadequate knowledge on emergency procedures;
   - inability to carry out relevant checks during engine RPM drop as per the PA-38-112 POH and
   - mishandling of the aircraft, were contributed to this incident.

In addition to the above, poor situational awareness, decision making and non – adherence to the POH were also contributed to this incident.

4 SAFETY ACTIONS

A Safety Bulletin on Carburettor Icing Prevention was issued by the DGCA to all AOC and ATO holders on 21st Feb 2022.

Further, following safety recommendations which require immediate actions, were issued to the Training Organization during preliminary investigation and the corrective actions are being taken.

a) The Accountable Manager and post holders of Sakurai Aviation Academy shall strictly comply with Regulation 240 of ANR of 1955.

b) Sakurai Aviation Academy shall ensure whenever an aircraft is refueled, the Journey log entry shall be raised by an authorized AME/ authorized PIC certifying the fuel mixture used (if applicable) and/ or other fuel used (AVGAS).

a) Sakurai Aviation Academy shall ensure to carry the journey log on board all flights including training flights.

b) Sakurai Aviation Academy shall strictly ensure to comply with the instructions issued by the DGCA in his letter Ref DG/16/1/12 dated 14th October 2021 on "Logging of Hours Flown Solo by a Student pilot".

c) Head of Training of Sakurai Aviation Academy shall ensure to train all the students on normal, abnormal and emergency checklist procedures.

5 SAFETY RECOMMENDATIONS

5.1 The PIC and the other occupant

a) The following were recommended for the PIC;
   I. Air Law examination -to be conducted by the CAASL
   II. Full Training on aircraft systems as stipulated in PA-38-112 POH and PPL syllabus given in the CAASL approved Training & Procedures Manual of Sakurai Aviation Academy - to be conducted by the Sakurai Aviation Academy.
   III. Undergo a check ride with an examiner assigned by CAASL.
   IV. An oral assessment on the CAASL Regulations and aircraft knowledge - to be conducted by the CAASL.

b) The following were recommended for the other occupant;
   I. Air Law examination to be conducted by the CAASL
   II. Full Training on aircraft systems as stipulated in PA-38-112- POH and PPL syllabus given in the CAASL approved Training & Procedures Manual of Sakurai Aviation Academy to be conducted by the Sakurai Aviation Academy.
   III. An oral assessment on the CAASL Regulations and aircraft knowledge to be conducted by the CAASL.

5.2 The Accountable Manager of the Training Organization

a) The Accountable Manager shall undergo a competency assessment by a panel appointed by the DGCA.

5.3 The Head of Training of the Training Organization

a) The Head of Training shall undergo a competency assessment on TAPM, relevant POHs and CAASL Regulations by a panel appointed by the DGCA.

5.4 The CFI of the Training Organization

a) The CFI shall undergo a competency assessment on TAPM, relevant POHs, & CAASL Regulations by a panel appointed by the DGCA.

5.5 The Safety Manger of the Training Organization

a) The Safety Manger shall undergo a competency assessment on Safety Management System Manual, TAPM and CAASL Regulations by a panel appointed by the DGCA.

5.6 The Head of Quality Assurance / Compliance Monitoring Manager of the Training Organization

b) The Head of Quality Assurance / Compliance Monitoring Manager shall undergo a competency assessment on TAPM and CAASL Regulations by a panel appointed by the DGCA.

5.7 The AMO of the Sakurai Aviation Ltd

a) Head of Engineering shall undergo a competency assessment on MOE procedures, CAASL regulations and responsibilities of post holder & certifying staff by a panel appointed by the DGCA.

b) Head of Quality shall undergo a competency assessment on MOE and Quality procedures, CAASL regulations and responsibilities as a post holder by a panel appointed by the DGCA.

c) The AMO post holder shall ensure to comply the form filling instructions on AJTL and train relevant officers.

5.8 The CAMO of the Sakurai Aviation Ltd

a) The CAM shall undergo a competency assessment on CAME and Quality procedures, CAASL regulations and the responsibilities as a post holder, by a panel appointed by the DGCA.

b) The Head of Quality shall undergo a competency assessment on CAME and Quality procedures, CAASL regulations and the responsibilities as a post holder, by a panel appointed by the DGCA.

a) The CAMO shall ensure to introduce Form Filling instructions on AJTL.

5.9 The Training Organization

a) The Training Organization shall ensure to carry out a full scale training of PA 38 – POH and other applicable POHs and be included in the training requirements into the TAPM together with a plan of an assessment of the same.

b) The Training Organization shall be submitted relevant POHs to the CAASL for the acceptance.

c) ATOs shall ensure to train all students on required checks during an engine RPM drop/ roughness and checks are required to be included into the Training syllabus.

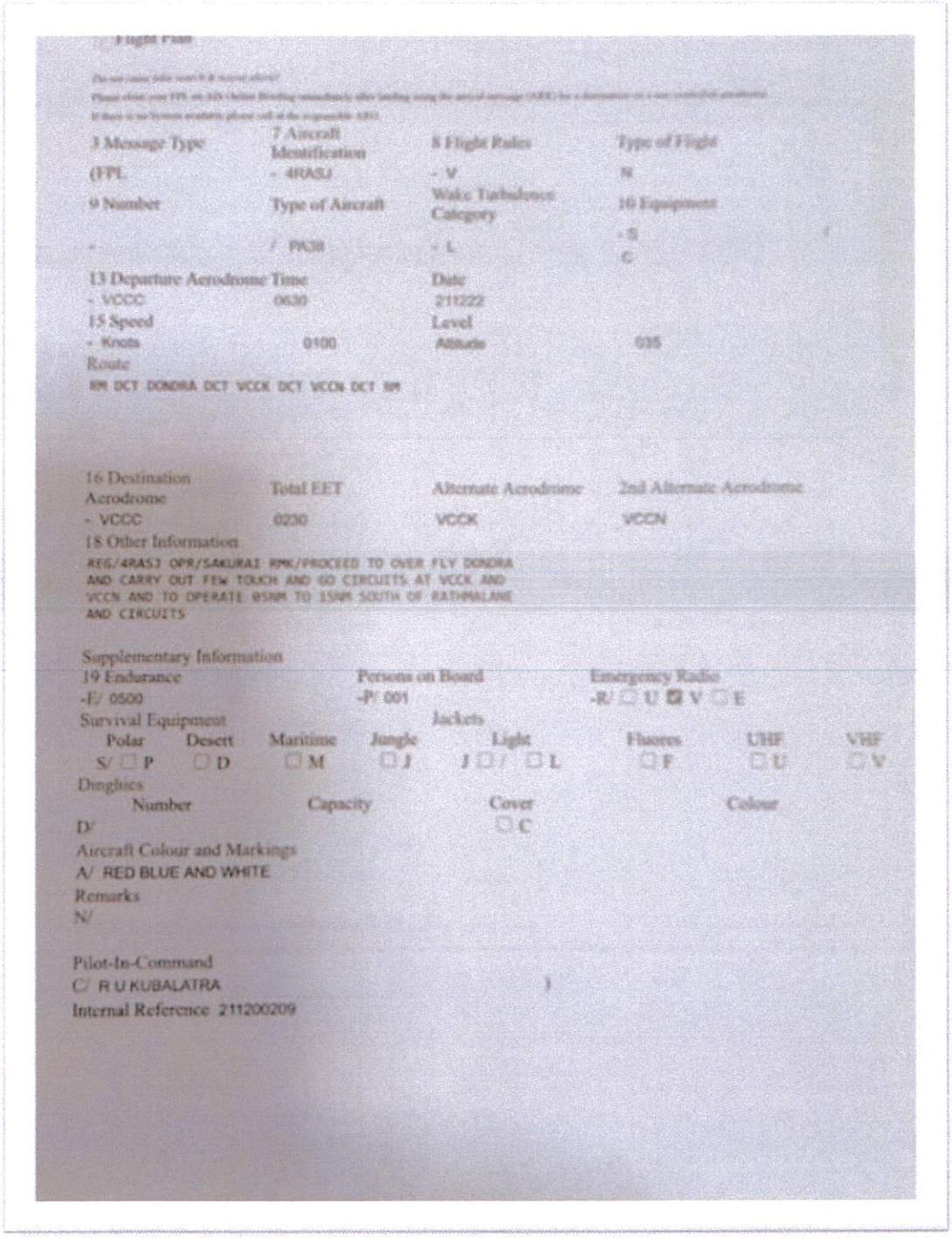
d) The Training Organization shall ensure the completion of ADC and ATC flight plan with accurate information and to submit accurate information to ATC Tower.

e) The Training Organization shall ensure pilots to carry out fuel drain checks prior to each flight as per the POH.
f) The Training Organization shall ensure that all pilots to carry out weight & balance calculations, prior to each flight.
g) The Training Organization shall ensure to amend the Technical Logbook to include the wordings *"after maintenance check"* in the heading for the column of Engineer Certification (CRS) and engineer to sign & release prior to each flight.
h) The Training Organization shall ensure to amend the Technical Logbook, to include wordings *"after pre-flight check as per the POH"* in the heading for the column of Pilot acceptance.
i) The Training Organization shall implement a proper process to disseminate regulatory documents, safety information/bulletins issued by the CAASL within the Organization.
j) The Training Organization shall establish a process to monitor strict compliance to the procedures stipulated in TAPM on pre-flight preparation by the students.
k) The Training Organization shall establish a process to monitor competencies on Flight & Ground Instructors and CFIs on both theoretical and practical knowledge as per the CAASL regulatory requirements.

5.10 All ATOs

a) All ATOs shall ensure the strict compliance to the Regulation 240 of ANR of 1955.
b) ATOs shall ensure to carry out a full scale training of applicable POHs and be included the training requirements into the TAPM together with a plan of an assessment of the same.
c) The Training Organization shall be submitted relevant POHs to the CAASL for the acceptance.
d) ATOs shall ensure to train all students on required checks during an engine RPM drop/ roughness and checks are required to be included into the Training syllabus.
e) All Pilots of the ATO to be strictly advised to carry out "Fuel drain" prior to each flight as stated in the relevant POH.
f) ATOs shall ensure that all pilots to carry out weight & balance calculations, prior to each flight.
g) ATOs shall ensure to amend the Technical Logbook, to include "after pre-flight check" in both columns of Pilot acceptance and Engineer certification (CRS).
h) Training Organizations shall ensure to amend the Technical Logbook to include the wordings *"after maintenance check"* in the heading for the column of Engineer Certification (CRS) and engineer to sign & release prior to each flight.
i) Training Organizations shall ensure to amend the Technical Logbook, to include wordings *"after pre-flight check as per the POH"* in the heading for the column of Pilot acceptance.
j) Training Organizations shall establish a process to monitor competencies on Flight & Ground Instructors and CFIs on both theoretical and practical knowledge as per CAASL requirements.

APPENDIX 1: ATC FLIGHT PLAN



Flight Plan

3 Message Type	7 Aircraft Identification	8 Flight Rules	Type of Flight
(FPL	- 4RASJ	- V	N
9 Number	Type of Aircraft	Wake Turbulence Category	10 Equipment
-	/ PA38	- L	- S / C

13 Departure Aerodrome Time / Date
- VCCC 0630 211222

15 Speed / Level
- Knots 0100 Altitude 035

Route
RM DCT DONDRA DCT VCCK DCT VCCN DCT RM

16 Destination Aerodrome	Total EET	Alternate Aerodrome	2nd Alternate Aerodrome
- VCCC	0230	VCCK	VCCN

18 Other Information
REG/4RASJ OPR/SAKURAI RMK/PROCEED TO OVER FLY DONDRA AND CARRY OUT FEW TOUCH AND GO CIRCUITS AT VCCK AND VCCN AND TO OPERATE 05NM TO 15NM SOUTH OF RATHMALANE AND CIRCUITS

Supplementary Information
19 Endurance -F/ 0500 | Persons on Board -P/ 001 | Emergency Radio -R/ ☐ U ☑ V ☐ E

Survival Equipment

Polar	Desert	Maritime	Jungle	Jackets Light	Fluores	UHF	VHF
S/ ☐ P	☐ D	☐ M	☐ J	J ☐ / ☐ L	☐ F	☐ U	☐ V

Dinghies

Number	Capacity	Cover	Colour
D/		☐ C	

Aircraft Colour and Markings
A/ RED BLUE AND WHITE

Remarks
N/

Pilot-In-Command
C/ R U KUBALATRA

Internal Reference 211200209

APPENDIX 2: FIRST AIR DEFENCE CLEARANCE REQUEST FORM

AIR DEFENSE CLEARANCE REQUEST FORM

FILING DATE - 22 DEC 2021 S/NO - 06 2.FILING TIME - 1115 LT

5.FLIGHT RULE - VFR 6.DEPARTURE AERODROME - VCCC

9. CREW

R U KUBALATRA 2001193658 PIC

10. FLIGHT PLAN 11. DATE OF ETD - 22 DEC 2021

ROUTE/DESTINATION	ESTIMATED TAKE OFF	ESTIMATED LANDING	LEVEL	POB	ALTERNATE AERODROM
VCCC - OVERFLY	12:00 LT	14:30 LT	1000 - 9000	02	VCCN/VCCK

12.REQUIRED ASSISTANCE FROM SLAF/INTENDED EXERCISE/HELICOPTER LANDING LOCATION

TOUCH AND GO CIRCUITS THEN PROCEED TO 05-15NM SOUTH OF RATMALANA AND CIRCUITS RATMALANA LANDING

13. WHETHER DANGEROUS GOODS ON BOARD – NO

EQUIPMENT	AVAILABILITY
NIGHT VISION CAMERAS	NO
ITEMS INTENDED TO BE TAKEN FROM SHIP TO LAND & VICE VERSA	NO

NAME	NIC/PP NO	REMARKS
RASIKA KUMARA		

APPENDIX 3: SECOND AIR DEFENCE CLEARANCE REQUEST FORM

SAKURAI AVIATION LIMITED

AIR DEFENSE CLEARANCE REQUEST FORM

1.FILING DATE- 22 DEC 2021 S/NO - 06	2.FILING TIME – 1245 LT
3.TYPE OF AIRCRAFT – PA38	4.AIRCRAFT REG/CALL SIGN – 4R-ASJ
5.FLIGHT RULE – VFR	6.DEPARTURE AERODROME - VCCC
7.CRUISING SPEED -100	8.ENDURANCE – 0500 HOURS

9. CREW

NAME	NIC/PP NO	REMARKS
R U KUBALATKA	200119365S	PIC
D M S S BANDARA	963591942V	PILOT

10. FLIGHT PLAN 11. DATE OF ETD - 22 DEC 2021

ROUTE/DESTINATION	ESTIMATED TAKE OFF TIME	ESTIMATED LANDING TIME	LEVEL ALTITUDE	POB	ALTERNATE AERODROM -E
VCCC – OVERFLY DONDRA – VCCK - VCCN-VCCC	13.30 LT	16.00 LT	1000 - 9000	02	VCCN/VCCK

12.REQUIRED ASSISTANCE FROM SLAF/INTENDED EXERCISE/HELICOPTER LANDING LOCATION

PROCEED OVERFLY DONDRA THEN TO KOGGALA AND KATUKURUNDA TO DO FEW TOUCH AND GO CIRCUITS THEN PROCEED TO 05-15NM SOUTH OF RATMALANA AND CIRCUITS RATMALANA LANDING

13. WHETHER DANGEROUS GOODS ON BOARD – NO

14. AVAILABILITY OF SPECIAL EQUIPMENT

EQUIPMENT	AVAILABILITY
AERIAL PHOTOGRAPHIC CAMERAS	NO
SENSING REQUIREMENT	NO
NIGHT VISION CAMERAS	NO
WINCHING/RAPPELING EQUIPMENT	NO
ITEMS INTENDED TO BE TAKEN FROM SHIP TO LAND & VICE VERSA	NO

15. PASSENGER MANIFEST

NAME	NIC/PP NO	REMARKS

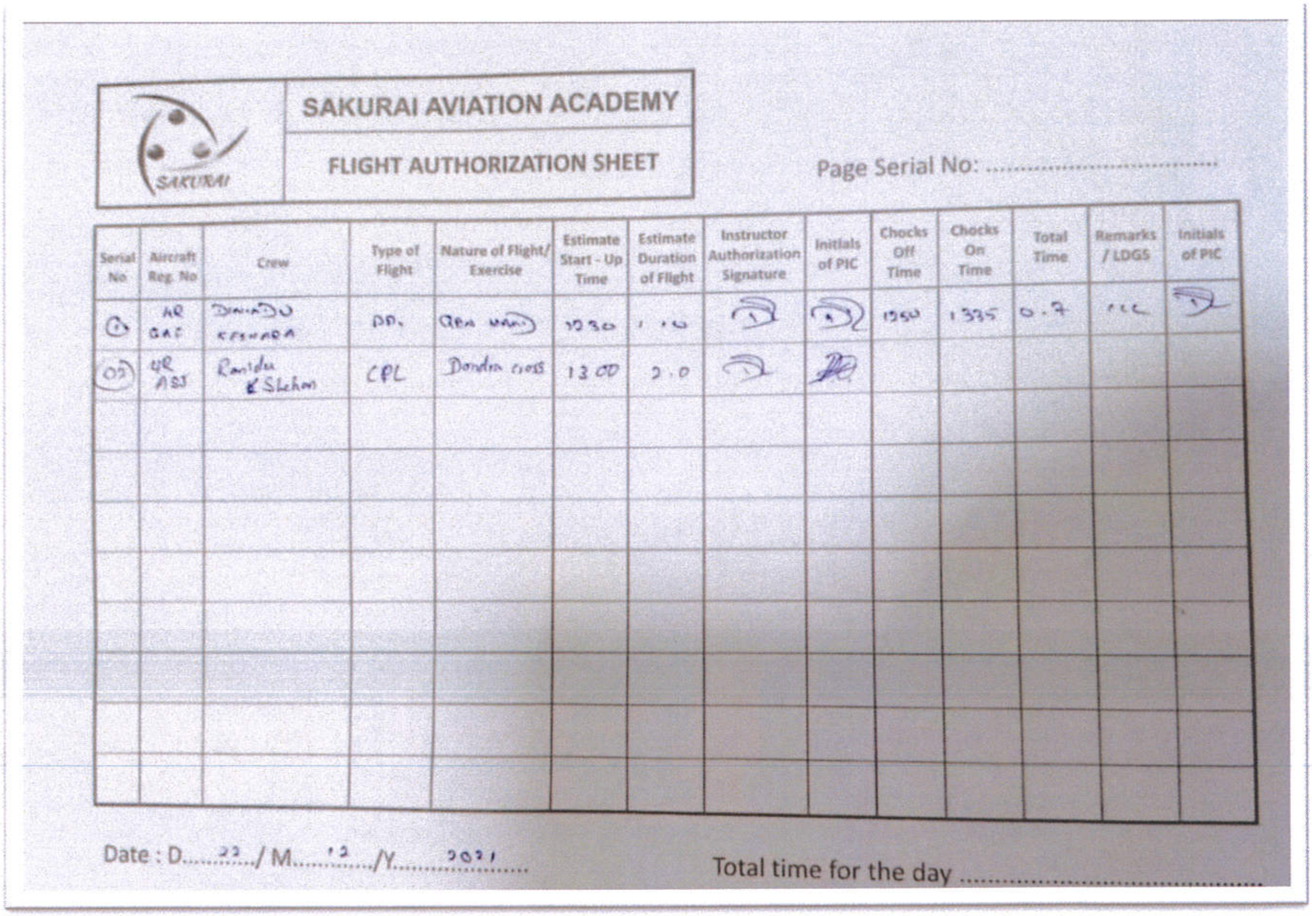
16. VEHICLE & DRIVER DETAILS

DISPATCHER: RASIKA KUMARA 0703626311

ATC OFFICER:

SAKURAI AVIATION LIMITED TEL: 0112623310 SAL/OPS/002

APPENDIX 4: 4R-ASJ FLIGHT AUTHORIZATION SHEET FOR 22ND DEC 2021



SAKURAI AVIATION ACADEMY

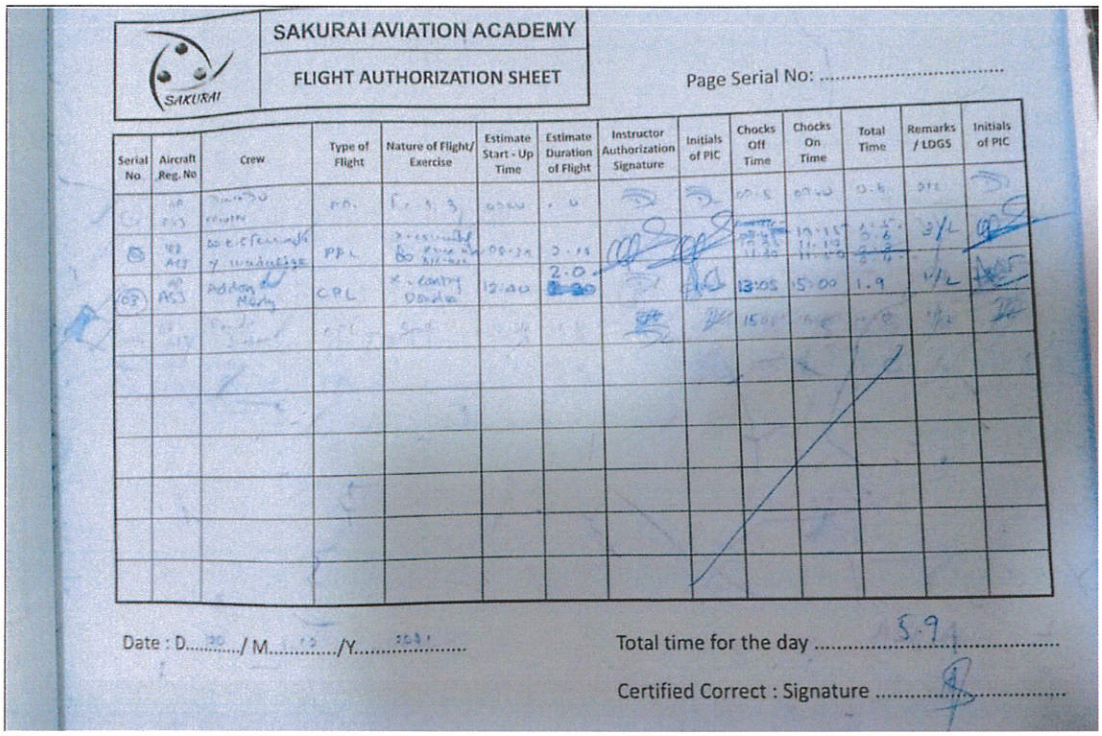
FLIGHT AUTHORIZATION SHEET

Page Serial No: ....

Serial No	Aircraft Reg. No	Crew	Type of Flight	Nature of Flight/ Exercise	Estimate Start - Up Time	Estimate Duration of Flight	Instructor Authorization Signature	Initials of PIC	Chocks Off Time	Chocks On Time	Total Time	Remarks / LDGS	Initials of PIC
01	4R GAF	DININDU KESHARA	PP.	[illegible]	1230	1.0	[signature]	[signature]	1250	1335	0.7	[illegible]	[signature]
02	4R ASJ	Ranidu & Shehan	CPL	Dondra cross	13 00	2.0	[signature]	[signature]					

Date : D....22../ M.....12..../Y.......2021....... Total time for the day ....

APPENDIX 5 – 4R-ASJ FLIGHT AUTHORIZATION SHEET FOR 20TH DEC 2021



SAKURAI AVIATION ACADEMY

FLIGHT AUTHORIZATION SHEET

Page Serial No: .....

Serial No	Aircraft Reg. No	Crew	Type of Flight	Nature of Flight/ Exercise	Estimate Start - Up Time	Estimate Duration of Flight	Instructor Authorization Signature	Initials of PIC	Chocks Off Time	Chocks On Time	Total Time	Remarks / LDGS	Initials of PIC
			PPL										
			CPL		12:00	2.0			13:05	15:00	1.9		

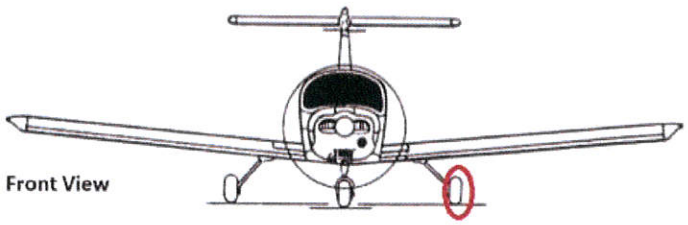
Date : D...../ M...../Y.....

Total time for the day 5.9

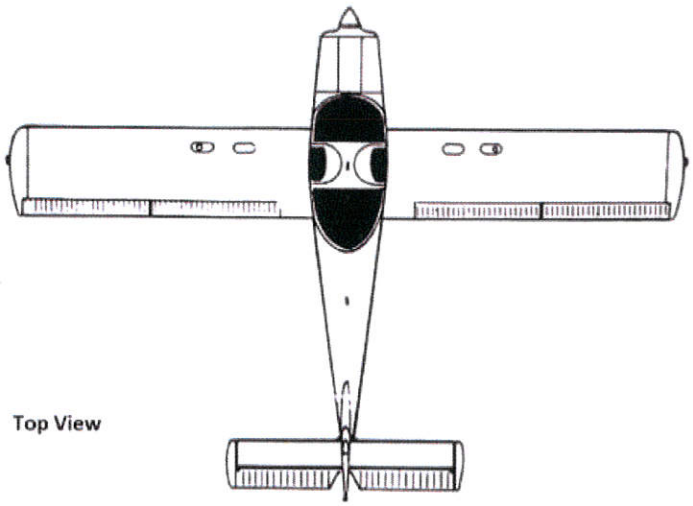
Certified Correct : Signature .....

APPENDIX 6- DAMAGE TYRE OF THE 4R-ASJ DUE TO IMPACT

4R – ASJ Piper PA38-112 Tomahawk

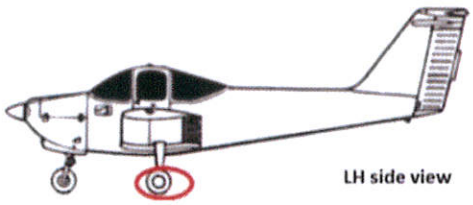


Front View

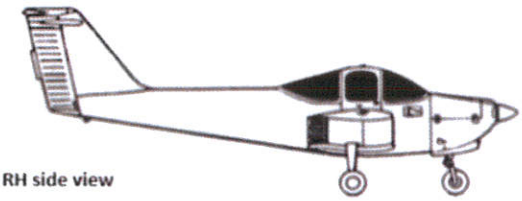


Top View

4R – ASJ Piper PA38-112 Tomahawk

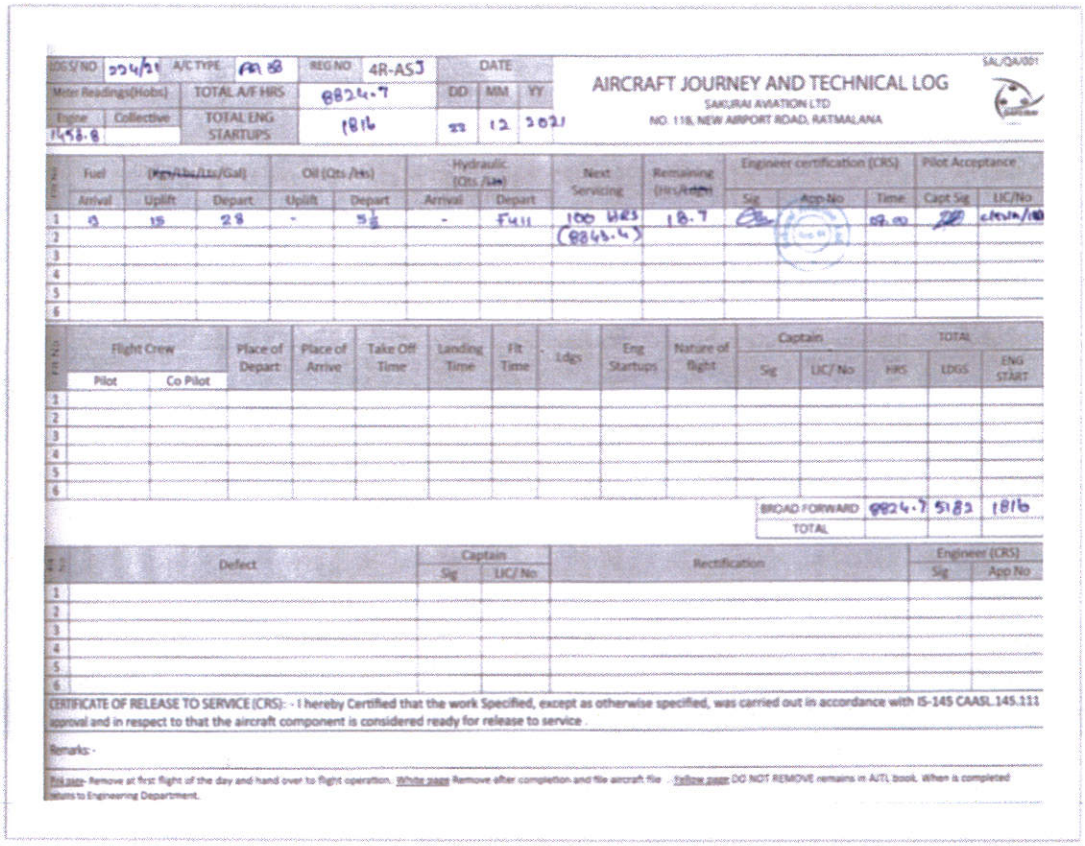


LH side view



RH side view

APPENDIX 7: AIRCRAFT JOURNEY AND TECH LOG /4R-ASJ ON 22ND DEC 2021



JOG S/NO 224/21 A/C TYPE [illegible] REG NO 4R-ASJ DATE

Meter Readings(Hobs) TOTAL A/F HRS 8824.7 DD MM YY

Engine 1498.8 Collective TOTAL ENG STARTUPS 1816 22 12 2021

AIRCRAFT JOURNEY AND TECHNICAL LOG

SAKURAI AVIATION LTD

NO. 118, NEW AIRPORT ROAD, RATMALANA

SAL/QA/001

S/N	Fuel (Kgs/Lbs/Ltr/Gal) Arrival	Uplift	Depart	Oil (Qts /Ltrs) Uplift	Depart	Hydraulic (Qts /Ltrs) Arrival	Depart	Next Servicing	Remaining (Hrs/Months)	Engineer certification (CRS) Sig	App No	Time	Pilot Acceptance Capt Sig	LIC/No
1	5	15	28	-	5½	-	FULL	100 HRS (8848.4)	18.7			09.00		clear/10
2														
3														
4														
5														
6														

S/N	Flight Crew Pilot	Co Pilot	Place of Depart	Place of Arrive	Take Off Time	Landing Time	Flt Time	Ldgs	Eng Startups	Nature of flight	Captain Sig	LIC/ No	TOTAL HRS	LDGS	ENG START
2															
2															
3															
4															
5															
6															
												BROAD FORWARD	8824.7	5182	1816
												TOTAL			

S/N	Defect	Captain Sig	LIC/ No	Rectification	Engineer (CRS) Sig	App No
1						
2						
3						
4						
5						
6						

CERTIFICATE OF RELEASE TO SERVICE (CRS): - I hereby Certified that the work Specified, except as otherwise specified, was carried out in accordance with IS-145 CAASL.145.111 approval and in respect to that the aircraft component is considered ready for release to service .

Remarks: -

Pink page- Remove at first flight of the day and hand over to flight operation. White page Remove after completion and file aircraft file . Yellow page DO NOT REMOVE remains in AJTL book. When is completed returns to Engineering Department.

APPENDIX 8: WEIGHT & BALANCE FORM (CALCULATED FROM THE ACTUAL FIGURES FOR THE INVESTIGATION PURPOSE)

Piper PA-38-112 Tomahawk Weight & Balance Form

Basic Empty Weights : **4R-ASJ** : 542.0 Kg (**1195 Lbs**) @ 74.49 Inches

Aircraft **MTOW** : 757.4 Kg (**1670 Lbs**)

Max Fuel Capacity : 30 US gallon = 113.56 L
84.37 Kg (**186 Lbs**)

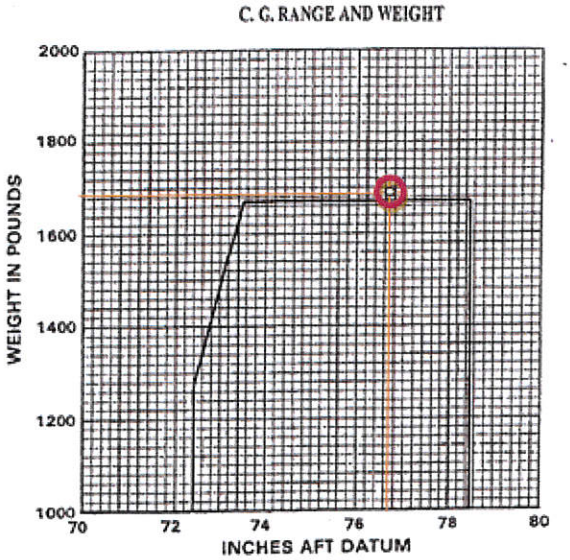
VALUE	Kg	Lb (Kgx2.205)	ARM (In) Aft of datum	MOMENT (Lb-In)
Basic Empty Weight	542	1195	74.49	89.015
Pilot	75.4	166	85.5	14.19
Passenger	82.7	182	85.5	15.56
Fuel (Kg=Lx0.72)	76.2	168	75.4	12.667
Baggage (45Kg MAX)	-	-	-	-
TOTAL	776.3	1711		131.432

LOADED MOMENT: TOTAL MOMENT (Lb-In) / TOTAL Lb = **76.815**

Instructions:

Use below Figure to calculate GC position:

A point is plotted on the chart using TOTAL Lb (WEIGHT IN POUNDS) on the vertical axis, and LOADED MOMENT (INCHES AFT DATUM) on the horizontal axis. This point must fall within the box to satisfy maximum takeoff weight & CG requirement.



Centre of gravity limits

Weight (lb)	Forward limit Inches aft of datum	Rearward limit Inches aft of datum
1,670	73.5	78.5
1,277	72.4	78.5

The datum used is 66.25 inches ahead of the wing leading edge.

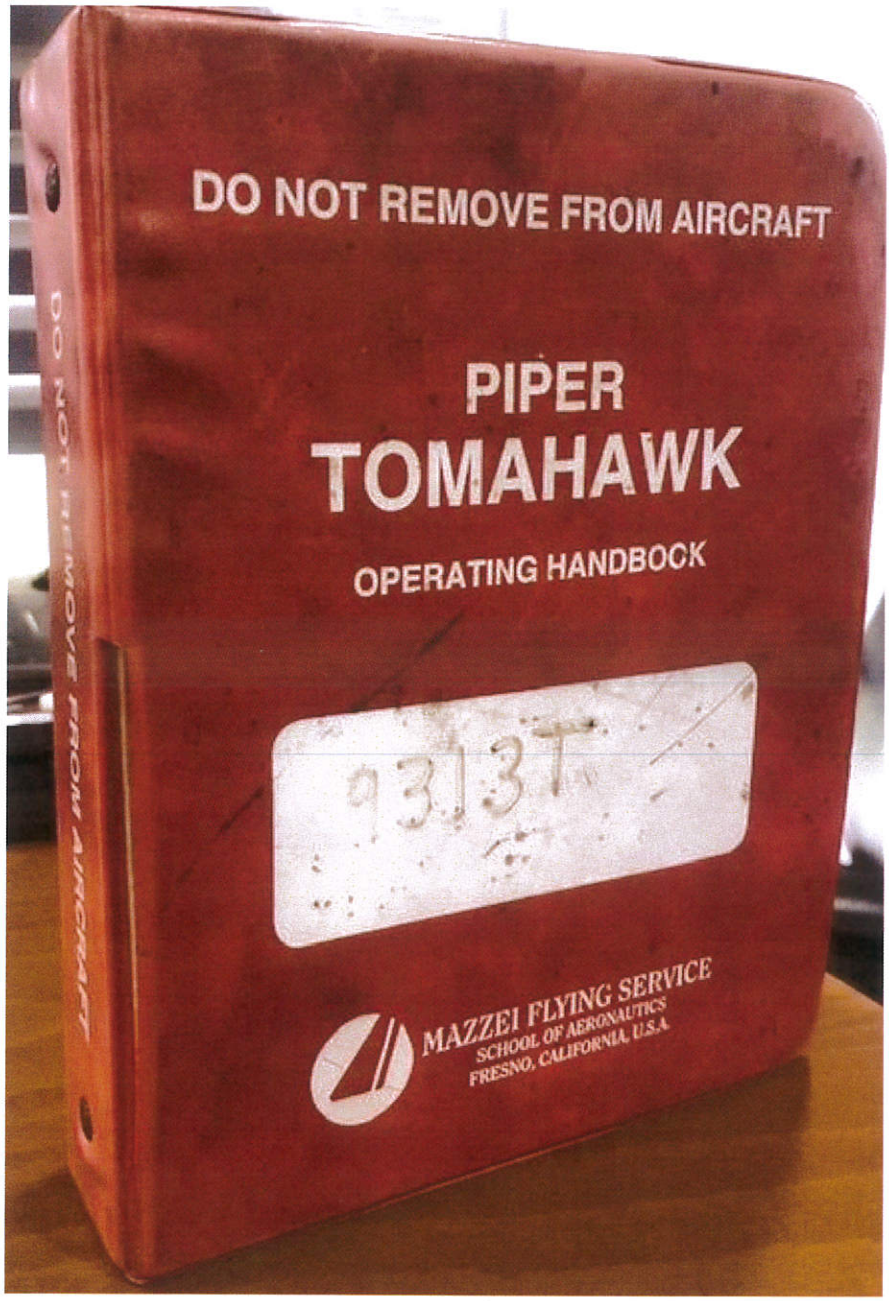
Limits

Weight limits

Maximum weight: 1,670 lb

Maximum weight in baggage compartment: 100 lb

APPENDIX 9: PA-38-112- PILOT'S OPERATING HANDBOOK



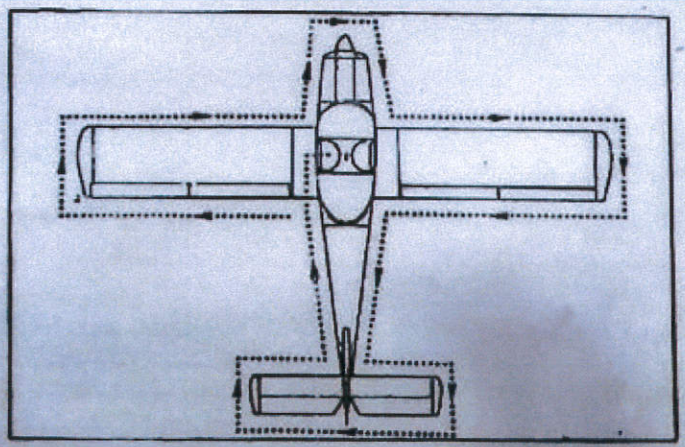
APPENDIX 10: PIPER TOMAHAWK PA-38-112-PILOTS CHECKLIST USED BY THE TRAINING ORGANIZATION

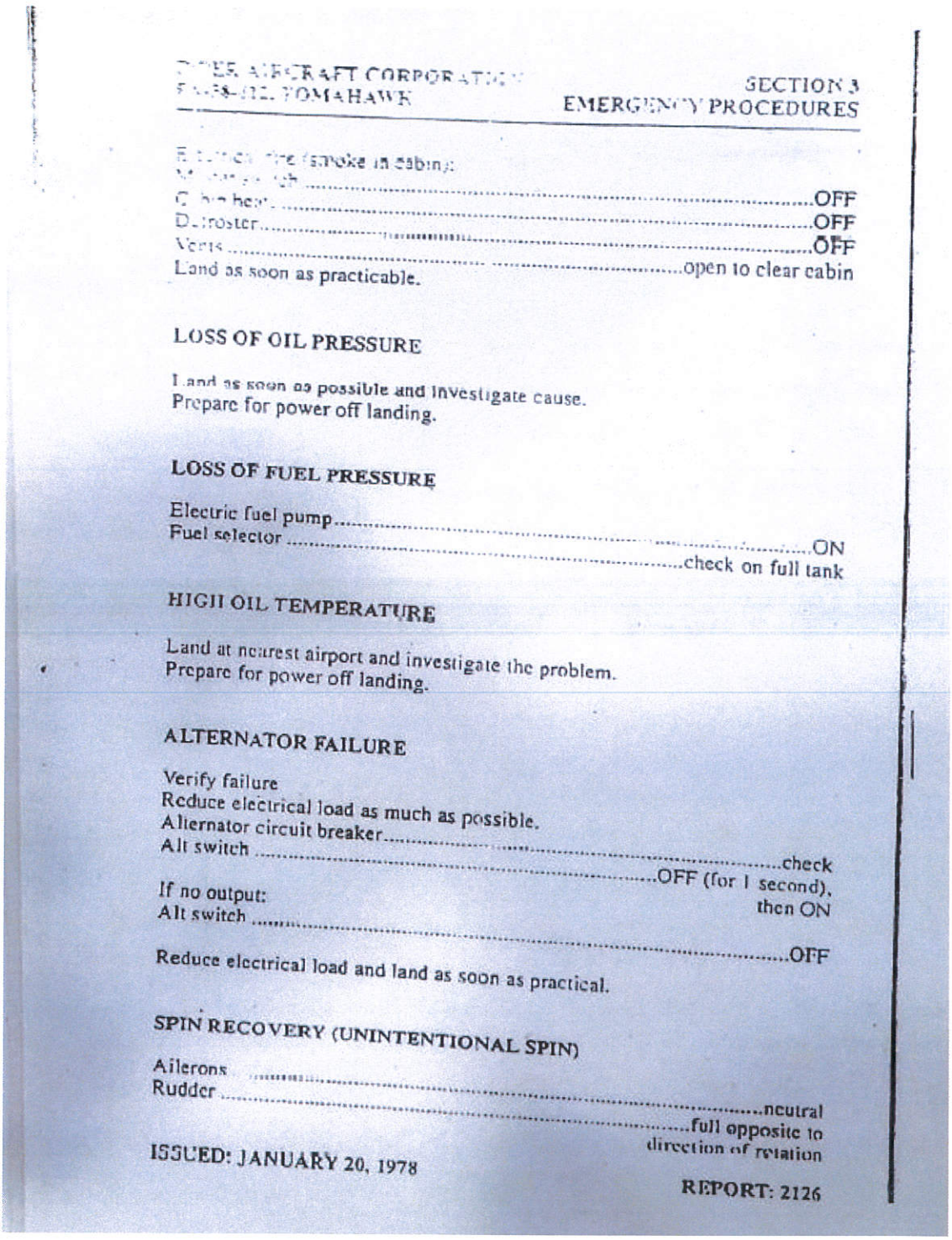
Sakurai Aviation Academy

SAKURAI

Piper Tomahawk PA – 38

Pilots Checklist





PIPER AIRCRAFT CORPORATION
PA-28-161 WARRIOR II

SECTION 3
EMERGENCY PROCEDURES

If [illegible] fire/smoke in cabin:
Master switch ..... OFF
Cabin heat ..... OFF
Defroster ..... OFF
Vents ..... open to clear cabin
Land as soon as practicable.

LOSS OF OIL PRESSURE

Land as soon as possible and investigate cause.
Prepare for power off landing.

LOSS OF FUEL PRESSURE

Electric fuel pump ..... ON
Fuel selector ..... check on full tank

HIGH OIL TEMPERATURE

Land at nearest airport and investigate the problem.
Prepare for power off landing.

ALTERNATOR FAILURE

Verify failure
Reduce electrical load as much as possible.
Alternator circuit breaker ..... check
Alt switch ..... OFF (for 1 second), then ON

If no output:
Alt switch ..... OFF

Reduce electrical load and land as soon as practical.

SPIN RECOVERY (UNINTENTIONAL SPIN)

Ailerons ..... neutral
Rudder ..... full opposite to direction of rotation

ISSUED: JANUARY 20, 1978

REPORT: 2126

STARTING ENGINE WHEN HOT

~~Throttle~~	~~cracked~~
Master switch	ON
Electric fuel pump	ON
Mixture	full RICH
Starter	engage
Throttle	adjust
Oil pressure	check
Electric fuel pump	OFF
Fuel pressure	check

STARTING ENGINE WHEN FLOODED

Throttle	open full
Master switch	ON
Electric fuel pump	OFF
Mixture	idle cut-off
Starter	engage
Mixture	advance
Throttle	retard
Oil pressure	check
Fuel pressure	check

STARTING WITH EXTERNAL POWER SOURCE*

Master switch	OFF
All electrical equipment	OFF
Terminals	connect
External power plug	insert in fuselage
Proceed with normal start:	
Throttle	lowest possible RPM
External power plug	disconnect from fuselage
Master switch	ON - check ammeter
Oil pressure	check

WARM-UP

Throttle ..... 800 to 1200 RPM

*Optional equipment