



AIRCRAFT ACCIDENT FINAL REPORT
SI 07/22P
Air Accident Investigation Bureau (AAIB)
Ministry of Transport Malaysia

Textron Aviation 172S, Registration 9M-HOT
at Sultan Azlan Shah Airport, Ipoh, Perak
on the 25 October 2022



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**AIR ACCIDENT INVESTIGATION BUREAU (AAIB)
MALAYSIA**

ACCIDENT REPORT NO.:SI 07/22

OPERATOR : LAYANG LAYANG FLYING ACADEMY
AIRCRAFT TYPE : TEXTRON AVIATION 172S
NATIONALITY OF AIRCRAFT : MALAYSIA
REGISTRATION : 9M-HOT
**PLACE OF OCCURRENCE : SULTAN AZLAN SHAH AIRPORT, IPOH
(WMKI)**
DATE AND TIME : 25 OCTOBER 2022 AT 1230 LT

The sole objective of the investigation is the prevention of accidents and incidents. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of this investigation to apportion blame or liability.

All times in this report are Local Time (LT) unless stated otherwise. LT is UTC + 8 hours.

INTRODUCTION

The Air Accident Investigation Bureau of Malaysia

The Air Accident Investigation Bureau (AAIB) is the air accidents and serious incidents investigation authority in Malaysia and is responsible to the Minister of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and serious incidents.

AAIB also conducts investigations into incidents when the occurrence shows evidence to have safety issues concerned.

AAIB conducts all accident and serious incident investigations in accordance with Annex 13 to the Chicago Convention and Civil Aviation Regulations of Malaysia 2016.

It is inappropriate that AAIB reports should be used to assign fault or blame or determine liability since neither the investigation nor the reporting process has been undertaken for that purpose.

In accordance with ICAO Annex 13 paragraph 4.1, notification of the accident was sent on 30 October 2022 to the National Transportation Safety Board of the United States of America as State of Design and as State of Manufacturer. A copy of the Preliminary Report was subsequently submitted to the above organization, the Civil Aviation Authority of Malaysia (CAAM), and the Aircraft Operator on 2 December 2022.

Unless otherwise indicated, recommendations in this report are addressed to the investigating or regulatory authorities of the State having responsibility for the matters with which the recommendations are concerned. It is for those authorities to decide what action is taken.

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GLOSSARY OF ABBREVIATIONS

A

A	Accident
AAIB	Air Accident Investigation Bureau
ac	aircraft
AFRS	Airport Fire and Rescue Services
AGL	Above Ground Level
ATC	Air Traffic Controller
ATCO	Air Traffic Controller Officer
ATO	Approved Training Organisation
ATPL	Air Transport Pilot Licence

B

BMR	Base Maintenance Release
-----	--------------------------

C

CAAM	Civil Aviation Authority Malaysia
CAD	Civil Aviation Directive
CB	Cumulonimbus Clouds
CCT	Circuits
CFI	Chief Flight Instructor
CI/HOT	Chief Instructor/Head of Training
CP	Cadet Pilot
CPL	Commercial Pilot's Licence
CVR	Cockpit Voice Recorder

F

FDR	Flight Data Recorder
FEW	few
FI	Flight Instructor
ft	feet

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G

GH General Handling

H

Hrs hours

I

ICAO International Civil Aviation Organisation

i.e. id est or 'that is'

IF Instrument Flying

IR Instrument Rating

K

KLIA Kuala Lumpur International Airport

L

LH Left Hand

LT Local Time

LYG Layang

M

M metres

MASB Malaysia Airports Sendirian Berhad

MOR Mandatory Occurrence Report

P

PAPI Precision Approach Path Indicator

R

RH Right Hand

RPM Revolution per Minute

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S

SOP Standard Operating Procedures
SPL Student Pilot Licence

T

TO Take-Off
TP Trainee Pilot
TPM Training Procedures Manual

U

UTC Coordinated Universal Time

V

VFR Visual Flight Rule

X

XC Cross Country

W

WMKI Ipoh (Sultan Azlan Shah Airport)

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SYNOPSIS

A Textron Aviation 172S aircraft with callsign LYG 1339 was on a planned navigation solo training flight (XC06). The aircraft departed Sultan Azlan Shah Airport (WMKI) at 1009 LT for route 7B as per the flight planned route.

Start-up, Taxi, Take Off and Navigation Exercise was uneventful. However, during the final landing, the Trainee Pilot (TP) encountered three bounced landings which resulted in a heavy landing. The aircraft taxied back to the bay without any further incident. The Pilot exited safely without any injuries. The aircraft sustained some physical damage to its rudder, fuselage, and propeller. The Trainee Pilot was brought to the clinic for a post-accident medical check-up.

A Mandatory Occurrence Report (MOR) was submitted by the Aircraft Operator to the Civil Aviation Authority of Malaysia (CAAM) and Air Accident Investigation Bureau, Malaysia (AAIB) as notification of the serious incident.

1.0 FACTUAL INFORMATION

1.1 History of the Flight

Trainee Pilot (TP) with call sign LYG 1339 was planned for Navigation Solo flight, a programme in the flight training syllabus as Navigation Solo 06 (XC 06).

Pre-flight checks, start and taxi were normal. The ac took off at 1009 LT from WMKI Runway 04 on planned route 7B, i.e. Ipoh – Lasah – Kampung Ayer Panas – Baling – Tasik Muda – Jeniang – Kampung Karangan – Kuala Kurau – Redang Panjang – Kuala Sepetang – Beruas – Parit – Batu Gajah – Ipoh. The TP encountered bad weather (CB cloud and rain) while enroute from Baling to Beruas and requested to descend from 5000 ft to 2000 ft. At Parit, the TP regained visual and could see Batu Gajah. Ipoh Tower instructed the TP to track for the final on straight in approach but the TP requested to track the dead side and was approved by Ipoh Tower. After holding at the dead side due to one departure, the TP then cleared to descend 1000 ft LH downwind and was asked to report final. Once on final, Ipoh Tower cleared the ac to land Runway 04.

Rolling out for the approach to land, the TP realised the approach was quite high judging from the PAPI lights which indicate 4 white. The TP made approach path corrections on the final to 2 Reds and 2 White on the PAPI lights. The ac continued on a normal approach with the aiming point at the 1000 ft marker on the normal final speed of 70 knots. The TP flared at the normal flaring attitude and pulled power to idle and waited for the aircraft to sink. The ac landed hard on the runway centreline and subsequently bounced hard thrice on the right of the runway centreline before landing finally.

During the ac bounce, the TP realised the seat belt came loose from the pilot seat belt buckle, resulting in the TP being thrown off from the pilot seat. The TP managed to control the ac back to the runway centreline and continue to vacate the runway via Taxiway Charlie to Bay 1. Runway inspection was carried out at 1235 LT and the runway resumed normal operations at 1241 LT. The Trainee Pilot was sent to Path Lab Ipoh for a post-accident medical check-up.

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The aircraft suffered damage to the propeller, nose landing gear, below fuselage, floorboard (centre pedestal), and tail section. It was impounded for AAIB investigation.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others	Total
Fatal	Nil	Nil	Nil	Nil
Serious	Nil	Nil	Nil	Nil
Minor/None	1	Nil	Nil	1

Figure 1: Injuries to persons

1.3 Damage to Aircraft

Post-accident inspection revealed the following damage to the aircraft:

- a. Propeller.



Figure 2: All Propeller blades bent inwards at the blade tips.

b. Nose landing gear.



Figure 3: Nose landing gear. Damaged on riveted joints.

c. Below fuselage.



Figure 4: Below fuselage. Found deep scratches.

d. Floorboard (Centre Pedestal).

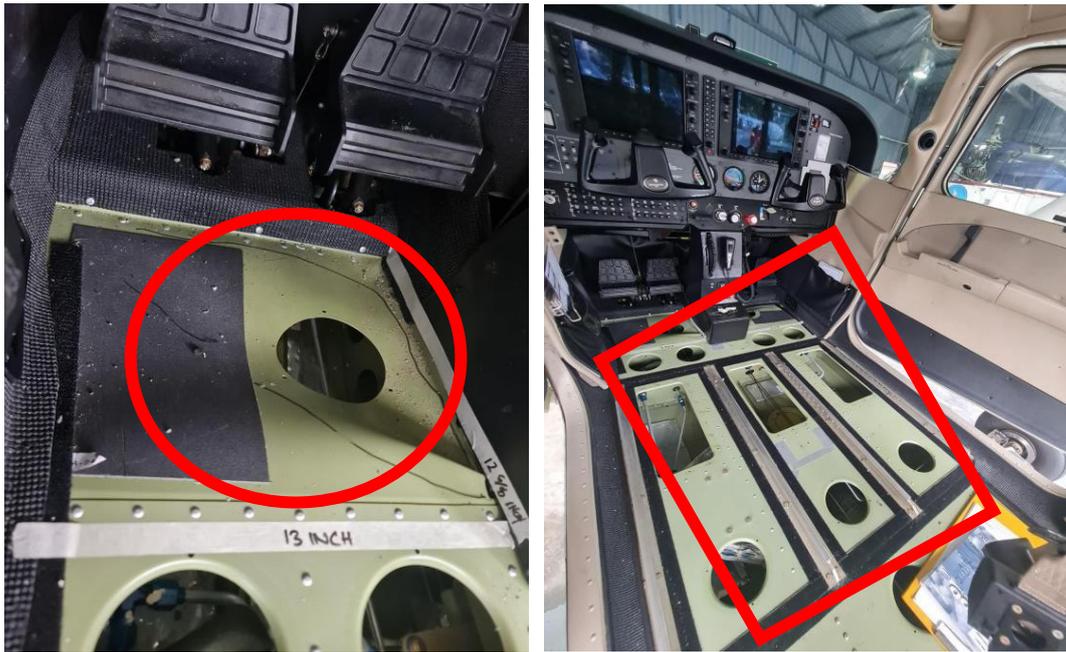


Figure 5: Forward Left and Right Floorboard Assembly found wrinkled and buckled.

d. Tail section.



Figure 6: Rudder Lower tip found scratches

1.4 Other Damage

No reported damages to aerodrome facilities or other properties.

1.5 Personnel Information

1.5.1 Pilot in Command

Nationality		Malaysian
Age		21
Gender		Female
License Type		SPL
License Expiry		31 January 2023
Medical Expiry		31 January 2023
Aircraft Rating		N/A
Instructor Rating		N/A
Flying Hours	Total Hours	96
	Total on Type	21

Figure 7: Personnel Information – Pilot in Command

1.6 Aircraft Information

The aircraft flown on that day was in airworthy condition. The last scheduled maintenance i.e. 50 hours /operation 1 at 1231:46 hrs were carried out on 19 Oct 2022. The aircraft had flown 11:30 hrs after the scheduled maintenance with no defect recorded till the accident date (25 Oct 2022).

Aircraft Type	Textron Aviation 172S
Manufacturer	Textron Aviation Inc.
Year of Manufacture	2020

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Owner	Layang Layang Flying Academy
Registration No.	9M-HOT
Aircraft Serial No.	172S - 12489
Certificate of Airworthiness Issue / Expiry date	9 Sept 2022 / 08 Sept 2023
Certificate of Registration Issue / Expiry date	21 Oct 2020 / 20 Oct 2023
Total Flight Hours	1243:16

Figure 8: Aircraft Data

1.7 Meteorological Information

The incident happened at noon. Actual weather was fine, visibility was reported at more than 10 km, and the wind was 040° at 03 knots.

1.8 Aids to Navigation

All navigation aids were operating normally.

1.9 Communications

All ATC communications frequencies were operating normally.

1.10 Aerodrome Information

Airfield	Sultan Azlan Shah Airport (WMKI)
Runway	04/22
Length	2000 m
Width	45 m
ICAO Designator	WMKI
IATA Designator	IPH
Elevation	131 ft / 40 m

Figure 9: Sultan Azlan Shah Airport (WMKI) Aerodrome Information

1.11 Flight Recorders

The aircraft was not equipped with Flight Data Recorder (FDR) or Cockpit Voice Recorder (CVR). It is equipped with Garmin G1000. The Garmin G1000 is an electronic flight instrument system (EFIS) typically composed of two display units, one serving as a primary flight display, and one as a multi-function display.

1.12 Wreckage and Impact Information

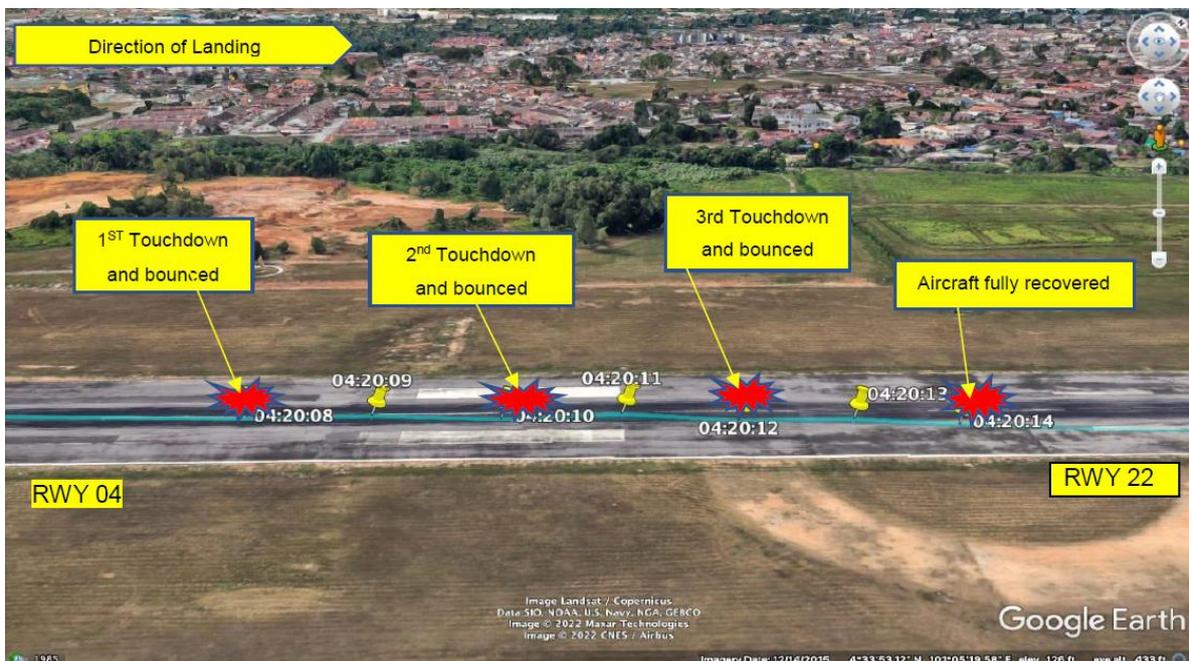


Figure 10: Landing path
(Diagram not to scale)

1.13 Medical and Pathological Information

The TP underwent a urine drug test and the results were negative for substance abuse.

1.14 Fire

There was no pre or post-impact fire.

1.15 Survival Aspects

There were no injuries to the TP.

1.16 Tests and Research

The TP reported the seat belt came off and was thrown off position during the hard landing. The pilot and co-pilot seat belt restraint system hardware inspection were done by LLFA Engineering and found satisfactory and airworthy. The seat belt came off from the buckle was most probably due to TP not fully securing it during strapping before the flight.

1.17 Organisational and Management Information

The Aircraft Operator is an Approved Training Organisation (ATO) by CAAM for pilot training since the year 2019 and is situated at Sultan Azlan Shah Airport (WMKI), Ipoh, Perak. It operates 3 types of aircraft i.e. 3 x single-engine Textron Aviation C172, 2 x single-engine Piper 28 and 1 x twin-engine Piper 34. The main flying course conducted by the Aircraft Operator is the Integrated Course of Commercial Pilot Licence (CPL) / Instrument Rating CPL/IR (A).

The Aerodrome Operator for WMK) is Malaysia Airports Sdn Bhd (MASB). MASB is licensed by the Ministry of Transport Malaysia to operate, manage, and maintain all airports in Malaysia except Kuala Lumpur International Airport (KLIA).

1.18 Additional Information

1.18.1 Interview and Statements

The AAIB investigation team conducted separate interview sessions with TP, CFI, Duty ATCO and Maintenance Organisation Technical Controller. The interview sessions were all recorded under the express knowledge of all the parties. All of the above personnel had also submitted written statements.

1.19. Useful or Effective Investigation Techniques

The aircraft was not installed with an FDR or a CVR. It is equipped with Garmin G1000. Data from Garmin G1000 was used in the analysis of this incident.

2.0 ANALYSIS

2.1 On-site Investigation.

The AAIB Investigation team conducted the investigation on the runway and found 3 scratched markings on the runway. The scratched markings were from the impact of the rudder lower tip (figure 11) and the propeller (figure 12) during the hard landing and was confirmed by the TP during the interview.



Figure 11: Scratched marking from the rudder lower tip on the runway during the hard landing.



Figure 12: Scratched marking from the propeller on the runway during the hard landing.

2.2 On-Site Investigation Analysis

Figure 13 shows the profile of the ac on the final approach to land. The ac approach height was not stable (high) and not as per the 3° glide path. It shows the ac speed of 70-80 KIAS (Figure 14) on the final approach does not follow the C172 SOP Performance Landing Procedure (Figure 15) which states that the final approach technique is achieved not below 65 knots aiming to achieve a touchdown speed of 50 knots. Due to high-speed descent after adjusting the pitch from a high approach, the TP was unable to control the ac to land smoothly. TP's flaring of the ac at 29 ft which the flaring height between 10-15 ft. Due to the high sink rate and the TP applying too much back pressure while flaring the ac, it resulted a hard bounced landing and the ac ballooned on the runway. The TP should initiate a go-around as per LLFA Student Study Guide paragraph 13.3.5 when the approach was seeming to be an unstabilised approach (Figure 16).

The first touchdown which was landing hard resulted the rudder's lower tip striking the runway (figure 11). On the second hard bounce landing, the ac ballooned toward the right of the runway centreline and resulted the propeller hitting the runway (figure 12). On the third bounce, the TP managed to control the ac by bringing it back to the runway centreline and land.

The hard landing caused some damage to the ac such as the propeller, tail section, nose wheel, floorboard and below the fuselage.

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Figure 13: Data extracted from Garmin G 1000 shows the flight path of the aircraft during the final approach to land.

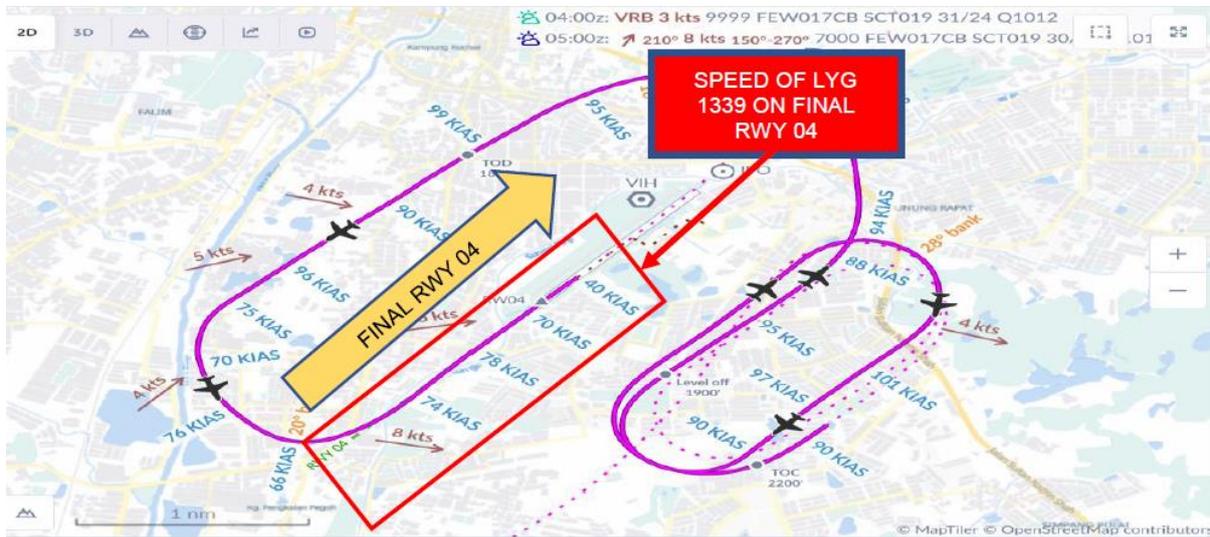


Figure 14: Data from Garmin G1000 shows the speed of the aircraft on the final to land

PERFORMANCE LANDING

7. The circuit pattern is flown as the normal circuit or the low-level circuit. The Final Approach technique is to achieve not below 65 knots at 200' AGL and aiming to achieve a touchdown speed of 50 knots. To achieve the shortest possible landing run, aim to, and flare so as to touch down on the 500' markers. Immediately after touchdown on the main wheels, check Throttle closed, lower the Nose Wheel onto Runway, select Flap 0° and apply optimum braking with the Control Column fully until the aircraft comes to a stop.

Figure 15: C172 SOP on Performance Landing

13.3.5 The Go Around from Final

You might have to go around for any of these reasons:

- You have made a bad approach.
- You are told to do so by ATC.
- The approach is baulked.

To go around:

1. Level the wings.
2. Set MAX power and select a shallow climbing attitude.
3. When the aircraft is climbing safely, ensure flap at 10°.

Raise the flap once you are above 70 KIAS/200 feet AGL

4. Lookout above and behind and turn gently onto the dead side.
5. Carry out the after-take-off checks.
6. Level off at 1000 ft and fly another circuit.

Figure 16: LLFA Student Study Guide – The Go Around from Final

2.3 Solo Flight Requirements

The TP started flying with Piper 28 ac and clocked 45 hrs before proceeding to simulator training. After completing the simulator training for 30 hrs, TP continue flying with C172 ac and clocked 18 hrs prior to the incident.

The TP's last training flight prior to the incident was on 18 October 2022 where TP was flying with FI on a navigation exercise (XC 09). TP was programmed for solo navigation exercise on 25 October 22 which was seven (7) days lapsed as in the LLFA Training and Procedure Manual (figure 17). The flight was the TP's first solo navigation flight on C172.

LLFA TPM on Solo Flying Requirements (figure 17) stated TP's with hours more than 40 shall not fly solo if they have not flown an Academy aircraft within the previous 7 days. The 40 hrs stated in the TPM are not clear and should be specific as 40 hrs on the type and not interpreted as 40 hrs all types. The TP only clocked 18 hrs on C172 prior to the incident.

TP's lack of experience on C172 (**18 hrs**) and long lay-off flying (**7 days**) are also contributing factors to the hard landing.

1.4.1.6. Solo Flying Requirements.

A. Pilots shall have demonstrated their competence to an Academy instructor and shall have signed as having read this TPM prior to flying solo in any Academy aircraft.

B. Trainee Pilots (TP)

(1) TP with less than 2 hours solo flying shall fly with an FI prior to each solo flight.

(2) TP with hours less than 40 shall not fly solo if they have not flown an Academy aircraft within the previous 2 days.

(3) TP with hours more than 40 shall not fly solo if they have not flown an Academy aircraft within the previous 7 days.

(4) TP with hours less than 40 shall not fly more than 3 hours solo between dual instructional flights.

(5) All solo flying by a TP shall be arranged to terminate 30 minutes prior to sunset.

Figure 17: LLFA Training and Procedures Manual – Solo Flying Requirements

3.0 CONCLUSION

The incident of the hard landing shows an unsafe act by the TP during the final approach to land. The TP was on an unstable approach (high and flying too fast) during the touchdown. The TP should execute a go-around when the approach to land was not stable.

LLFA TPM on Solo Flying Requirements not clearly stated i.e. TP's with more than 40 hrs shall not fly solo if they have not flown the Academy ac within the previous 7 days. The 40 hrs have to be specific as 40 hrs on the type and not interpreted as 40 hrs all types. The TP should go for a check flight before allowing the TP to fly solo after 7 days of no flying.

3.1 Findings

- 3.1.1 The TP was properly licensed to fly the navigation training flight.
- 3.1.2 The aircraft was properly maintained and airworthy for the flight.
- 3.1.3 The incident happened at noon. The weather was fine.
- 3.1.4 The TP reported no abnormalities on the aircraft during the navigation training flight.
- 3.1.5 The TP admitted coming to land with a high approach which the PAPI indicates four whites.
- 3.1.6 The TP did not follow the LLFA Student Study Guide a go-around procedure when made a bad approach.
- 3.1.7 The ac suffered 3 bounces on landing.
- 3.1.8 The aircraft suffered damage to the propeller, nose landing gear, below fuselage, floorboard (centre pedestal), and tail section.
- 3.1.9 The TP's last flight was on 18 October 22 which was 7 days prior to the incident.

3.2 Causes/Contributing Factors

- 3.2.1 The cause of the incident was TP's **Judgement and Decision-Making Error** by continuing the approach for landing. TP's should make a go-around as stipulated in the LLFA Student Study Guide – The Go Around from Final when the approach to land was unstable.
- 3.2.2 No checked flight was done to TP before allowing the TP to fly solo after 7 days of no flying.

4.0 SAFETY RECOMMENDATIONS

4.1 The Aircraft Operator is to carry out the following safety recommendations:

4.1.1 To publish instructions or circulars to all Trainee Pilots to execute a go-around procedure on the final if the approach is bad or not stable.

4.1.2 To include the requirement in the Layang Layang Flying Academy Training and Procedures Manual for Flight Instructor to conduct a check ride on the Trainee Pilot who has not flown for 7 days before being allowed to fly solo.

4.1.3 To review the Layang Layang Flying Academy Training and Procedures Manual – Part 1 – General in paragraph 1.4.1.6 – Solo Flying Requirements, subparagraph B (3) “Trainee Pilot with hours more than 40 shall not fly solo if they have not flown an Academy aircraft within the previous 7 days” to be specific as 40 hrs on type and not interpreted as 40 hrs all type.

INVESTIGATOR IN-CHARGE

Air Accident Investigation Bureau

Ministry of Transport Malaysia