KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

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Aircraft Accident Investigation Report

Angkasa Aviation Academy

Beechcraft Baron G58; PK-LRV

Cakrabhuwana Airport, Cirebon

Republic of Indonesia

5 October 2023

2025

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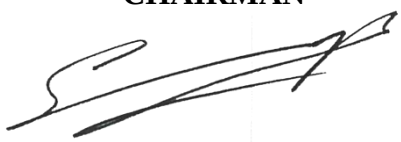
Jakarta, 10 March 2025
KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN



SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AAA	:	Angkasa Aviation Academy
AOC	:	Air Operator Certificate
ARFF	:	Airport Rescue and Fire Fighting
ATC	:	Air Traffic Controller
ATPL	:	Airline Transport Pilot License
CASR	:	Civil Aviation Safety Regulation
CB	:	Circuit Breaker
CPL	:	Commercial Pilot License
DGCA	:	Directorate General Civil Aviation
FI	:	Flight Instructor
FTD	:	Flight Training Device
KNKT	:	*Komite Nasional Keselamatan Transportasi* also known as National Transportation Safety Committee is the government institution of Republic of Indonesia, responsible to conduct transportation safety investigation.
LT	:	Local Time
MFD	:	Multi-Function Display
PF	:	Pilot Flying
PM	:	Pilot Monitoring
POH	:	Pilot Operating's Handbook
RPM	:	Rotation Per Minute
SD	:	Secure Digital
SEL	:	Single Engine Land
SOP	:	Standard Operating Procedure
TPM	:	Training Procedure Manual
UPBU	:	*Unit Penyelenggara Bandar Udara* is a unit within the Directorate General of Civil Aviation responsible to provide aviation services as airport operator.
UPRT	:	Upset Prevention and Recovery Training
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VMCA	:	Velocity Minimum Controllable Aircraft is defined as the minimum speed, whilst in the air, that directional control can be maintained with one engine inoperative.

SYNOPSIS

On 5 October 2023, a Beechcraft Baron G58 aircraft, registered PK-LRV was being operated by Angkasa Aviation Academy (AAA) on a multi-engine training flight at Cakrabhuwana Airport (WICD), Cirebon. The training was planned to be conducted in two flights by the Flight Instructor (FI) with one student pilot on each flight.

The Flight Instructor (FI) position in the AAA was the Assistant Chief Instructor and acted as Head of AAA. On the day of the occurrence, the FI was scheduled to attend the management meeting with the finance department personnel at 1000 Local Time (LT) to discuss management matters. The FI was in the fasting condition.

The FI conducted three training flights, in a multi-engine aircraft after the meeting with the finance department personnel was post poned. The first and third flight were area and touch-and-go exercises with student pilots. The training flight included stall and one engine inoperative training that required one or both throttle levers selection to idle.

If either throttle is retarded below approximately 13 in. Hg, the landing gear warning will active. During the third flight training that was conducted in 2 hours and two minutes, investigation found 16 exercise that would triggered the activation of landing gear warning with total duration of about 33 minutes and 4 seconds. This duration could have created a nuisance to the pilots and cause desensitization, which deteriorates sensitivity to the alert.

In addition, the FI might have been preoccupied with thinking of another task, whuch was the meeting with finance department personnel, during the final approach of the last training exercise.

Combination of the desensitization of multiple landing gear warning activations and the divided attention leads to lapses as an unintentional error in lowering the landing gear during aircraft landing in the last exercise.

The KNKT had been informed of safety actions resulting from this occurrence taken by the aircraft operator. However, there were still safety issues to be considered, therefore, the KNKT issued safety recommendations to the aircraft operator.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 5 October 2023, a Beechcraft Baron G58 aircraft, registered PK-LRV was being operated by Angkasa Aviation Academy (AAA) on a multi-engine training flight at Cakrabhuwana Airport (WICD), Cirebon. The training was planned to be conducted twice by the Flight Instructor (FI) with one student pilot on each training flight.

On the day of the occurrence, the FI was also acted as Head of AAA and scheduled to attend the management meeting with the finance department personnel at 1000 Local Time (LT[1]).

At 0821 LT, the aircraft was departed from Cakrabhuwana Airport for the first training flight. Prior to the departure, there was no record or report of aircraft system malfunction including the landing gear system.

The flight training was conducted in the training area and aerodrome traffic circuit. In the training area, the FI and first student pilot performed some exercises consisting of a clean stall, dirty stall, Upset Prevention & Recovery Training (UPRT), Velocity Minimum Controllable Aircraft (VMCA), and simulated one engine inoperative. The simulated one-engine inoperative was performed by reducing the one of the power levers to an idle position and maintaining the propeller pitch in a full forward position (high propeller Rotation per Minute (RPM)). According to the FI during the one engine inoperative exercise the landing warning horn and [gear up] annuinciation were active. On the aerodrome traffic circuit training, the exercises performed were touch and go with the normal engine and simulated one engine inoperative.

The first flight was completed uneventfully and and landed at 1011 LT. The aircraft then refueled for the next flight training. While waiting for the aircraft to be refueled, the FI went to the office to reconfirm whether the finance department personnel were ready to conduct the meeting. In the office, the FI met another FI who had the type rating expired. Having the finance department personnel not ready for the meeting, the FI decided to conduct recurrent flight for another FI who had the rating expired. After the refueling was completed, the second flight was conducted for the recurrent flight. The flight was conducted in the aerodrome traffic circuit for normal touch and go training. The second flight was completed uneventfully and the aircraft landed at 1144 LT.

After the second flight, the FI checked again whether the finance department personnel were ready for the meeting. Having the finance department personnel not ready, the FI decided to continue the multi-engine training flight with the second student pilot.

The multi-engine training for the second student pilot consisted of several stages and this flight was the last stage before the second student pilot conducted the Directorate General Civil Aviation (DGCA) check ride. Prior to departure, the FI and the second student pilot conducted the preflight inspection and found the aircraft condition was normal. The flight was conducted in accordance with Visual Flight Rules (VFR).

[1] Local time for Cakrabhuwana Airport (WICD), Cirebon is Western Indonesia Standard Time (Waktu Indonesia Barat - WIB) or UTC + 7.

At 1221 LT, the aircraft took off using Runway 04 and then proceeded to the Drama training area[2]. The exercise in the training area consisted of clean stall, dirty stall, UPRT, VMCA, and simulated one engine inoperative.

At 1326 LT, the training exercise at the Drama training area was completed and the aircraft went to the Cirebon traffic circuit of Runway 04 for the next exercise. The next exercise included touch and go exercises for both normal engines and simulated one engine inoperative.

At 1343 LT, the aircraft was on left downwind and the second student pilot performed normal engine touch and go.

At 1347 LT, the normal touch and go exercise was successfully executed. After the aircraft at an altitude of about 800 feet, the simulated one-engine inoperative was conducted by reducing the power lever on engine number one (left engine) and maintaining the propeller at high RPM. Thereafter, the exercise continued with the second touch and go with simulated one-engine inoperative.

The aircraft touched the runway and at 1352 LT, the aircraft was airborne with both engines operating normally. When the aircraft altitude was about 900 feet above MSL, another simulated one-engine inoperative exercise was conducted by reducing the power lever on engine number two (right engine), and continued for the third touch and go exercise.

The aircraft was un-stabilized on the final approach and the FI instructed the student pilot to make a go-around with simulated one engine inoperative, and then the aircraft proceeded to the left downwind.

On the left downwind, another aircraft was making an approach and the student pilot was instructed by air traffic controller to make an orbit for traffic sequencing.

At 1403 LT, the third touch and go exercise was commenced, and the aircraft airborne with both engines operated normally. Subsequently, the exercise was continued with simulated one engine inoperative and joined the right traffic pattern of Runway 04.

At 1408 LT, at the downwind, the FI planned to make a full stop landing and would attend the management meeting. The FI had several tasks in mind to be completed after the training exercise. On final Runway 04, the FI requested a full-stop landing to air traffic controller and was provided with landing clearance.

At 1411 LT, the aircraft touched down Runway 04. Thereafter, the FI heard strange sound and realized that the aircraft had landed without landing gear. The FI recalled that the landing checklist had not been executed and the landing gear lever had not been lowered. The FI then immediately lowered the landing gear lever. After the landing gear lever was lowered, the Circuit Breaker (CB) landing gear motor popped up.

The aircraft stopped about 600 meters from the beginning of Runway 04 in front of the Airport Rescue and Fire Fighting (ARFF) Station.

[2] The Drama training area located at radial 330° from Cakrabhuwana Non-Directional Beacon (NDB) with the distance about 33 Nm.

Figure 1: The aircraft condition after the stop

1.2 Injuries to Persons

No one was injured as a result of this occurrence.

1.3 Damage to Aircraft

The aircraft was substantially damaged as a result of the occurrence.

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Personnel Information

1.5.1 Flight Instructor (FI)

Gender	:	Male
Age	:	32 years
Nationality	:	Indonesia
Marital status	:	Married
Date of joining company	:	July 2013
License	:	ATPL
Date of issue	:	12 September 2017
Aircraft type rating	:	Boeing 737, Beechcraft Baron G58
Instrument rating validity	:	Valid
Medical certificate	:	Class 1
Last of medical	:	31 July 2023
Validity	:	2 February 2024
Medical limitation	:	The holder shall wear corrective lenses.
Certificate of Flight Instructor	:	Aircraft Multi-Engine Land
Date of issue	:	14 April 2023
Validity	:	13 April 2025

Flying experience		
Total hours	:	7,518 hours 16 minutes
Total on type	:	275 hours 22 minutes
Last 90 days	:	146 hours 34 minutes
Last 30 days	:	63 hours 40 minutes
Last 7 days	:	26 hours 20 minutes
Last 24 hours	:	4 hours 48 minutes

The FI position in the AAA was the Chief Instructor Assistant and since 2 October 2023 the FI also was appointed as acting Head of AAA. The office hour for the FI was started at started at 0800 LT and finished at 1700 LT. In addition, the FI also worked as airline pilot with flight duties normally conducted on the weekends.

On 4 October 2023 (one day prior to the occurrence), the FI had a scheduled training flight at AAA with a total flight time of 4 hours and 7 minutes (three flights). The first flight started at 0820 LT and the duty terminated following the office hour. The following days (the day of the occurrence), the FI started the flight training at 0810 LT. The detailed calculation of flight duty can be found in the appendices 6.1 of this report.

On the day of the occurrence, the FI was in a fasting condition and did not report to the flight operation. In addition, during the self-assessment before the flight, the FI stated that the fasting condition did not affect the training schedule with the student pilots.

1.5.2 Second Student Pilot

Gender	:	Male
Age	:	21 years
Nationality	:	Indonesia
Marital status	:	Single
Date of joining flying school	:	11 January 2021
License	:	CPL
Date of issue	:	6 April 2023
Aircraft type rating	:	Class Rating Single Engine Land (SEL)
Instrument rating	:	
Date of issue	:	8 March 2023
Medical certificate	:	First Class
Last of medical	:	27 June 2023
Validity	:	27 December 2023
Medical limitation	:	None

Last line check	:	Not Applicable
Last proficiency check	:	Not Applicable
Flying experience		
Total hours	:	205 hours 6 minutes
Total on type	:	14 hours 22 minutes (include Flight Training Device (FTD) 6 hours)
Last 90 days	:	8 hours 07 minutes
Last 30 days	:	8 hours 07 minutes
Last 24 hours	:	1 hours 50 minutes

On 3 October 2024, the second student pilot conducted the training flight with the FI and on 4 October 2024 (one day prior to the occurrence) the second student went to the training centre but did not have a flight training schedule. The calculated rest period of the second student pilot was more than 12 hours.

1.6 Aircraft Information

1.6.1 General

Registration Mark	:	PK-LRV
Manufacturer	:	Beechcraft
Country of Manufacturer	:	United States of America
Type/Model	:	Baron Baron G58
Serial Number	:	TH-2505
Year of Manufacture	:	2018
Certificate of Airworthiness		
Issued	:	15 October 2022
Validity	:	14 October 2023
Category	:	Normal
Limitations	:	None
Certificate of Registration		
Number	:	4090
Issued	:	2 October 2021
Validity	:	1 October 2024
Time Since New	:	857 hours 49 minutes
Cycles Since New	:	1,411 cycles
Last Major Check	:	31 July 2023
Last Minor Check	:	12 September 2023

1.6.2 Engines

Manufacturer	:	Continental Motors. Inc
Country of Manufacturer	:	United States of America
Type/Model	:	IO550C72B
Serial Number-1 engine	:	1035604
Type/ Model	:	IO550C72B
Installed	:	5 March 2018
Time Since New	:	857 hours 49 minutes
Cycles Since New	:	1,411 cycles

1.6.3 Landing Gear System

The landing gear of the aircraft was retractable and can be controlled by a two-position switch on the right side of the pilot's subpanel. The switch handle must be pulled out of the safety detent before it can be moved to the opposite position.

Figure 2: The landing gear lever position

According to the Baron G58 Pilot Operating's Handbook (POH) section 7, the landing gear system has warning horn and gear up annunciation which described as follow:

> *With the landing gear retracted, a warning horn will sound intermittently and the red [GEAR UP] warning alert will be displayed in the annunciation window of the PFD[3] if either throttle is retarded below approximately 13 in. Hg manifold pressure or if the flaps are fully extended. The ALERTS softkey in the lower right of the PFD will also change to a red flashing WARNING.*

[3] The PFD is Primary Flight Display.

During one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit.

1.7 Meteorological Information

The weather report for Cakrabhuwana Airport, issued on 5 October 2023, at 1400 LT (0700 UTC) was as follows:

Wind	:	050° / 10 knots
Visibility	:	6,000 meters
Cloud[4]	:	Scatter at 1,900 feet
Temperature	:	33°C
Dewpoint	:	20°C
Pressure (QNH[5])	:	1009 hPa
Weather	:	No significant

1.8 Aids to Navigation

The information related to aids to navigation was not relevant to this occurrence.

1.9 Communications

The aircraft was equipped with Very High Frequency (VHF) radio communication systems and used it to communicate with air traffic controller.

All communications between air traffic controller and the pilots were recorded by the ground-based automatic voice recording equipment. The quality of the transmissions was good. The relevant excerpts of the recorded communication between air traffic controller and the pilots are as follows:

Time (LT)	Event
12:06:30	The second student pilot requested engine start for dual training in the Drama Training Area which was approved by Cakrabhuwana Airport Air Traffic Controller (Cakrabhuwana ATC).
12:16:08	The second student pilot requested for taxi and was approved by the Cakrabhuwana ATC. The Cakrabhuwana ATC advised the student pilot to report when ready for departure.
Note: After the taxi clearance, the audio record revealed that the FI took over the communication.	
12:19:28	The FI reported ready for departure to the Cakrabhuwana ATC.
12:19:30	The Cakrabhuwana ATC issued takeoff clearance for PK-LRV and advised to maintain 1,000 feet.

[4] Cloud scatter is amount of cloud 3-4 oktas
[5] QNH is the Q code indicating the atmospheric pressure adjusted to mean sea level.

Time (LT)	Event
12:21:59	The FI reported that the aircraft reached an altitude of 1,000 feet. The flight then transferred to Kertajati ATC which was providing the ATC service in the training area. Subsequently, the FI contacted Kertajati ATC.
12:35:01	The FI reported to the Kertajati ATC that the aircraft was over Drama Training Area and requested approval to conduct the exercise at an aircraft altitude between 4,000 feet and 6,000 feet. The Kertajati ATC approved the pilot request.
13:26:31	The FI reported to the Kertajati ATC that the aircraft altitude was 5,000 feet and requested to leave the training area. The Kertajati ATC approved the pilot request. The aircraft then flew to Cakrabhuwana Airport via Point JAMBE – AMPEL – SURANENGGALA – CA NDB, and was instructed to altitude of 2,000 feet.
13:42:50	The FI reported to Kertajati ATC that the aircraft was over CA NDB with the aircraft altitude was 2,500 feet. The Kertajati ATC instructed the PK-LRV to descend to an altitude of 2,000 feet and to contact Cakrabhuwana ATC.
13:43:22	The FI made initial contact with Cakrabhuwana ATC and reported that the aircraft was at altitude of 2,000 feet. The Cakrabhuwana ATC instructed the PK-LRV to descend to altitude of 1,000 feet and join left downwind Runway 04.
13:44:51	The FI reported to Cakrabhuwana ATC that the aircraft was at the left downwind of Runway 04 and was responded to descend to the circuit altitude.
13:44:57	The FI requested to conduct a touch-and-go which was approved by the Cakrabhuwana ATC.
13:46:40	The FI reported to Cakrabhuwana ATC that the aircraft was on final and was cleared to perform the touch and go. The Cakrabhuwana ATC then instructed the PK-LRV to join left downwind.
13:51:41	Cakrabhuwana ATC issued touch and go clearance to the PK-LRV and instructed to join right downwind.
13:57:19	The FI reported to Cakrabhuwana ATC that the aircraft was on final and was cleared to perform the touch and go.
13:57:38	The FI reported making a go around to the Cakrabhuwana ATC and was instructed to join left downwind.
14:00:37	Cakrabhuwana ATC instructed the FI to make an orbit on left downwind due to traffic.
14:02:22	The FI reported to the Cakrabhuwana ATC that the has been orbit

Time (LT)	Event
	completed. The Cakrabhuwana ATC instructed PK-LRV to continue the approach and to report on the left base.
14:03:38	The FI reported to the Cakrabhuwana ATC that the aircraft was on the right base leg, and was cleared to perform the touch-and-go.
14:06:35	The FI reported that the aircraft was on right downwind, and the Cakrabhuwana ATC instructed to report at the right base.
14:10:21	The Cakrabhuwana ATC provided a clearance for the touch and go, and was responded that the FI requested a full stop landing.
14:10:27	The Cakrabhuwana ATC issued landing clearance to the PK-LRV.
14:11:55	The FI declared "MAYDAY MAYDAY MAYDAY, a…landing gear failure". The Cakrabhuwana ATC acknowledged the distress message and stated that assistance was underway.
14:12:02	Communication between Cakrabhuana ATC and FI was terminated.

1.10 Aerodrome Information

Airport Name	:	Cakrabhuwana Airport
Airport Identification	:	WICD
Airport Operator	:	DGCA
Airport Certificate	:	0106/SBU/I/2022
Validity	:	25 January 2027
Coordinate	:	$06^0$45'23" S $108^0$32'18" E
Elevation	:	90 feet
Runway Direction	:	04-22
Runway Length	:	1,280 meters
Runway Width	:	30 meters
Surface	:	Asphalt

1.11 Flight Recorders

The aircraft was not equipped with flight recorders as it was not required by the current Indonesia Civil Aviation Safety Regulation (CASR).

The aircraft was equipped with Garmin G1000 which has the capability of flight navigation and flight data logging. The flight data logging recorded 43 parameters which are stored on a Secure Digital (SD) data card in the top card slot of the Multi-Function Display (MFD). The AIR/GROUND and flap parameters are not recorded in the flight data logging.

The significant parameters of the flight data are shown in the figure below.

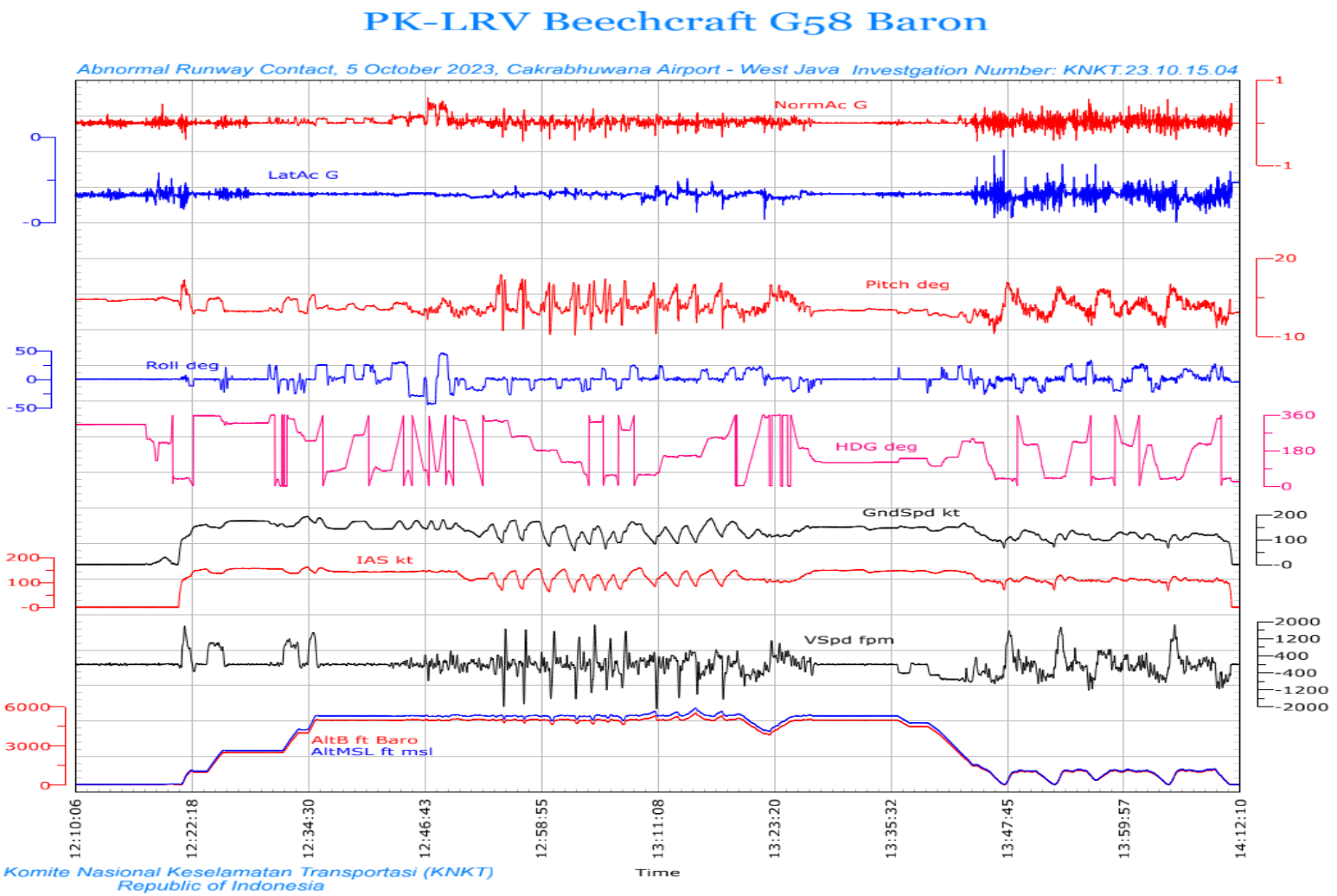

Figure 3: The PK-LRV all flight records

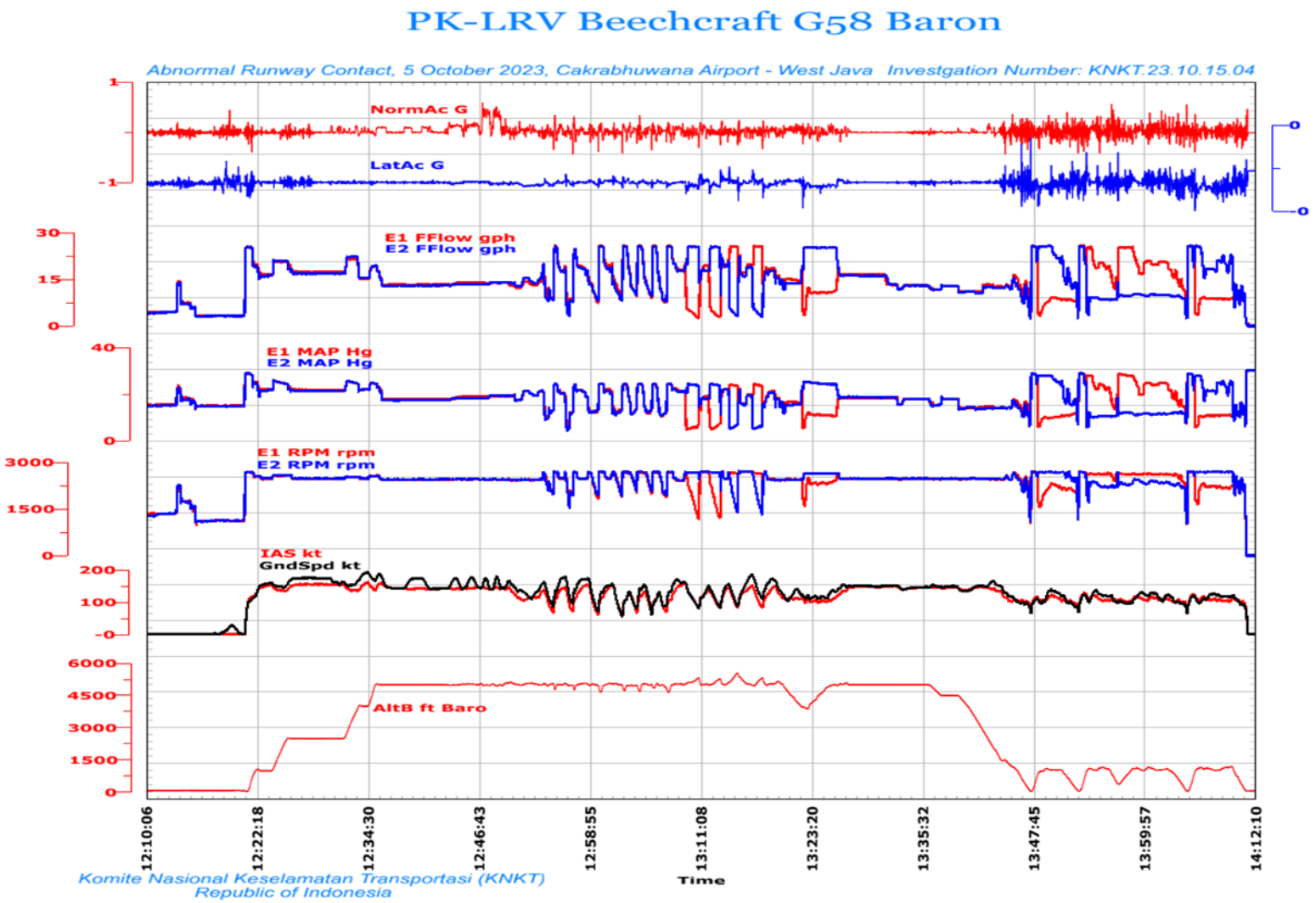

Figure 4: The PK-LRV engine parameters records

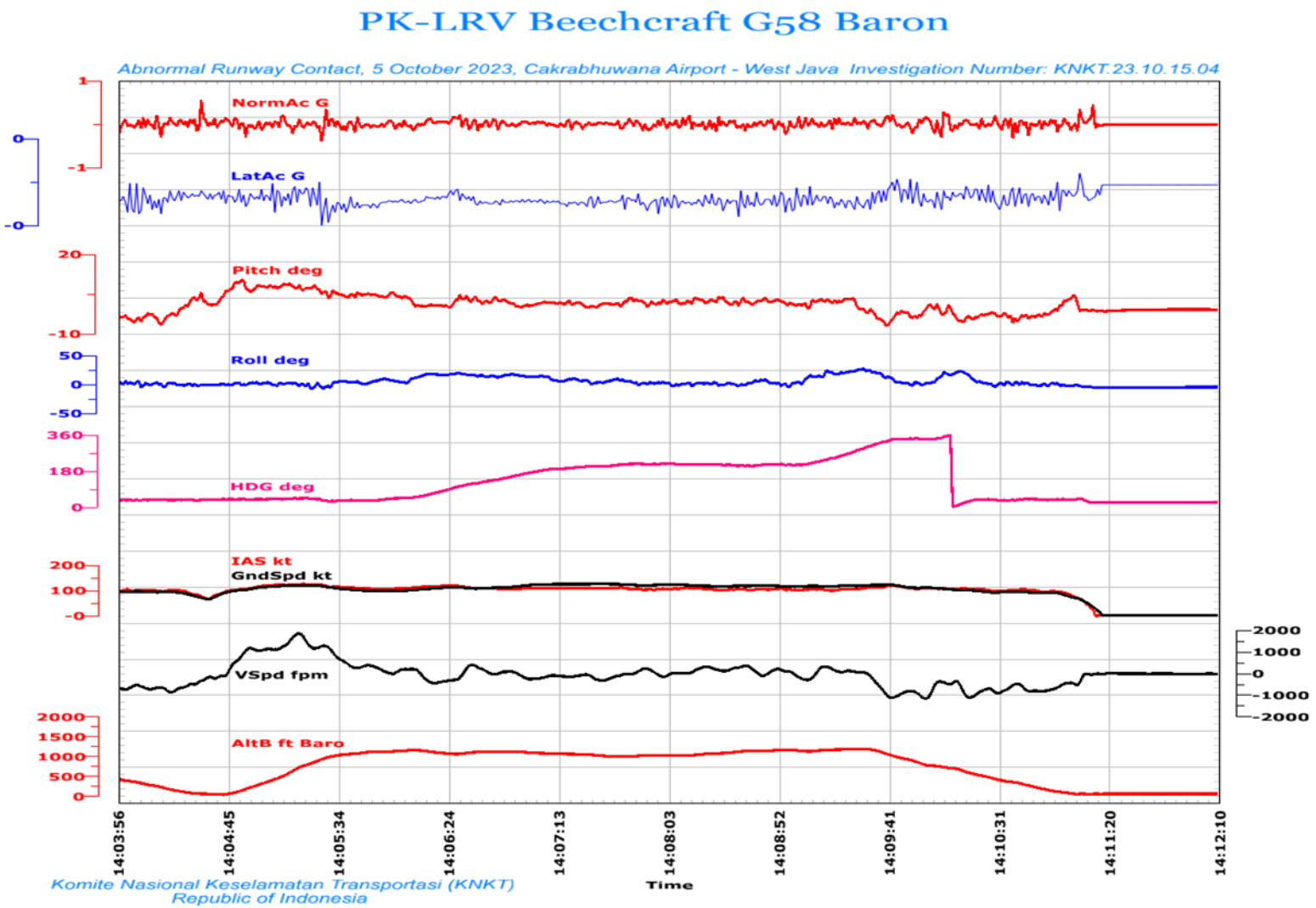

Figure 5: The PK-LRV last cycle flight parameters records

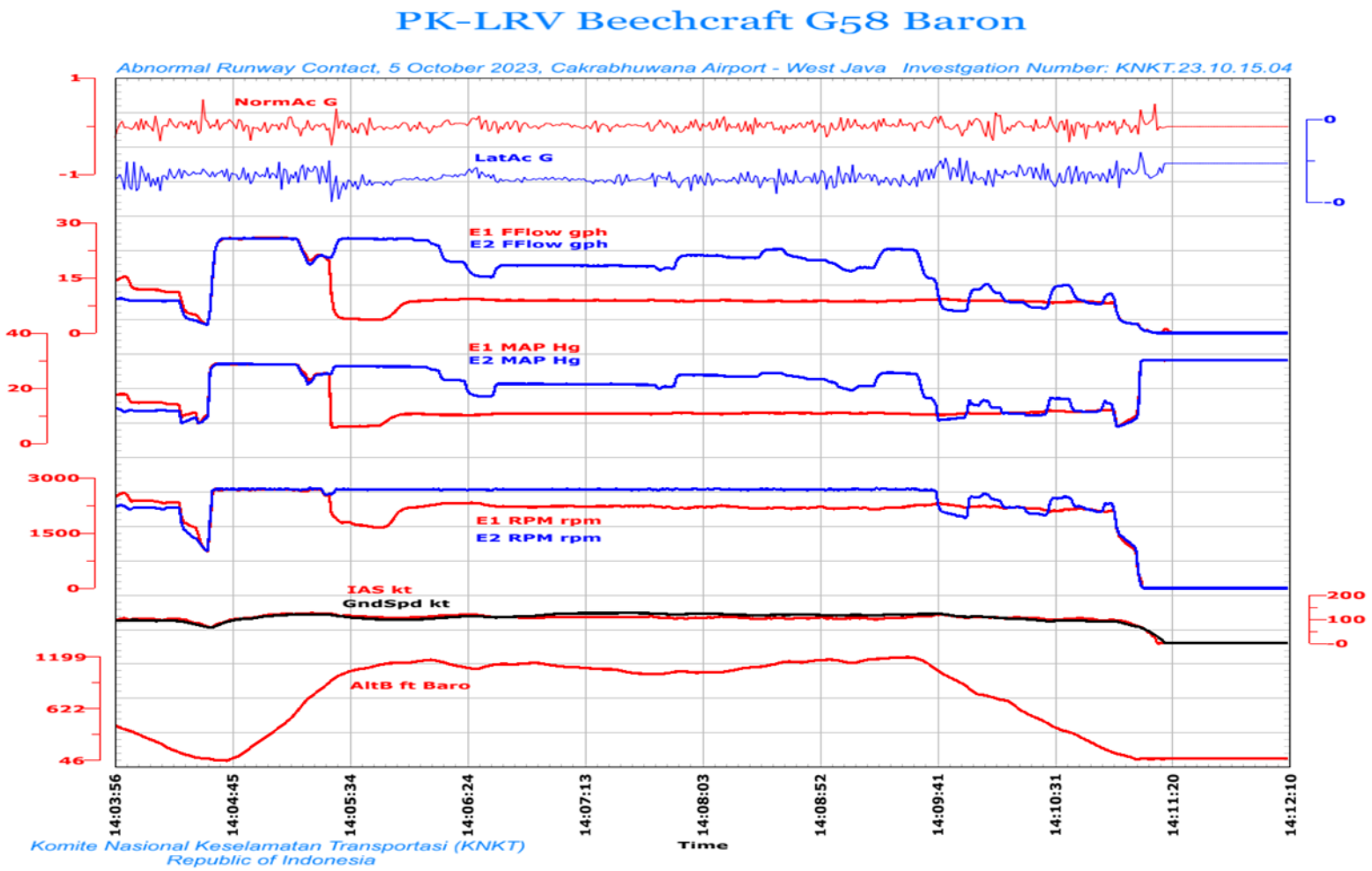

Figure 6: The PK-LRV last touch-and-go engine parameters record

The significant event as recorded in the flight data longing are as follows:

1. At 12:10:12 LT, both engines were already started indicated by the steady oil pressure of 41.6 and 44.86 pound square inch (psi), and the Manifold Absolute Pressure (MAP) of 15.33 and 14.53 Hg of the left and right engines respectively.
2. At 12:13:26 LT, the engine was run-up indicated by increasing the Fuel Flow (FF), MAP, and Engine revolution per minute (RPM). The engine run up completed at 12:15:30 LT.
3. At 12:17:28 LT, the aircraft was rolling for taxi out indicated by the groundspeed alive.
4. At 12:20:30 LT, the aircraft lined up indicated by the groundspeed stopped and the heading was aligned with the runway heading.
5. At 12:20:53 LT, the take-off was initiated, indicated by increasing the groundspeed and at 12:20:58 LT the indicated airspeed was alive.
6. At 12:21:12 LT, the aircraft was airborne, and at 12:22:26 LT the aircraft reached an aircraft altitude of 1,000 feet.
7. At 12:25:35 LT, the aircraft reached an aircraft altitude of 2,500 feet.
8. At 12:35:17 LT, the aircraft reached an aircraft altitude of 5,000 feet.
9. At 12:53:54 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The right engine MAP decreased to 11.24 Hg, one second later the left engine MAP decreased to 12.28 Hg. The altitude maintained about 5,000 feet, and the Indicated Air Speed (IAS) dropped from 138 knots to 69 knots in about 1 minute. At 12:54:53 LT, the engine operation resumed to normal.
10. At 12:56:13 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The right engine MAP decreased to 12 Hg, two second later the left engine MAP decreased to 12.46 Hg. The altitude maintained at 5,000 feet and the IAS dropped from 145 knots to 71 knots at 12:57:00 LT. At 12:57:01 LT, the engine operation resumed to normal.
11. At 12:58:44 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The right engine MAP decreased to 12.61 Hg, one second later the left engine MAP decreased to 12.79 Hg. The altitude maintained at 5,000 feet and the IAS dropped from 154 knots to 61 knots at 12:59:46 LT. At 12:59:48 LT, the engine operation resumed to normal.
12. At 13:01:35 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The right engine MAP decreased to 12.73 Hg, one second later the left engine MAP decreased to 12.65 Hg. At 13:02:21 LT, the right engine MAP increase to 13.03 Hg and the left engine MAP increase to 13.41 Hg. The altitude maintained at 5,000 feet and the IAS dropped from 139 knots to 60 knots at 13:02:24 LT. At 13:02:27 LT, the engine operation resumed to normal.
13. At 13:03:22 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The right engine MAP decreased to 11.91 Hg and the left engine MAP decreased to 11.88 Hg. At 13:03:54 LT, the right engine MAP increase to 13.02 Hg and the left engine MAP increase to 13.03 Hg.

The altitude maintained at 5,000 feet and the IAS dropped from 138 knots to 66 knots at 13:04:02 LT. At 13:04:05 LT, the engine operation resumed to normal.

14. At 13:05:06 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The left engine MAP decreased to 12.94 Hg, one second later the right engine MAP decreased to 12.5 Hg. At 13:05:37 LT, the right engine MAP increase to 13.37 Hg and the left engine MAP increase to 13.408 Hg. The altitude maintained at 5,000 feet and the IAS dropped from 120 knots to 66 knots at 13:05:40 LT. At 13:05:43 LT, the engine operation resumed to normal.
15. At 13:06:31 LT, the exercise of stall was performed indicated by the drop of both engines MAP. The left engine MAP decreased to 11.73 Hg and the right engine MAP decreased to 12 Hg. The altitude maintained at 5,000 feet and the IAS dropped from 130 knots to 71 knots at 13:07:18 LT. At 13:07:19 LT, the engine operation resumed to normal.
16. At 13:09:26 LT, the exercise of simulated one engine inoperative was performed indicated by the drop of the left engine MAP to 11.71 Hg while the MAP of the right engine MAP was 20.55 Hg. Simulate one engine inoperative last in 1 minute 28 seconds. At 13:10:55 LT, both engines operation resumed to normal.
17. At 13:12:01 LT, the exercise of simulated one engine inoperative was performed indicated by the drop of the left engine MAP to 11.27 Hg while the MAP of the right engine MAP was 18.17 Hg. Simulate one engine inoperative last in 1 minute 15 seconds. At 13:13:17 LT, both engines operation resumed to normal.
18. At 13:14:12 LT, the exercise of simulated one engine inoperative was performed indicated by the drop of the right engine MAP to 11.95 Hg while the MAP of the left engine MAP was 21.81 Hg. Simulate one engine inoperative last in 58 seconds. At 13:15:11 LT, both engines operation resumed to normal.
19. At 13:16:45 LT, the exercise of simulated one engine inoperative was performed indicated by the drop of the right engine MAP to 12.07 Hg while the MAP of the left engine MAP was 19.82 Hg. Simulate one engine inoperative last in 1 minutes 8 seconds. At 13:17:54 LT, both engines operation resumed to normal.
20. At 13:22:18 LT, the exercise of simulated one engine inoperative was performed indicated by the drop of the left engine MAP by 5.77 Hg while the MAP of the right engine MAP was 21.78 Hg. Simulate one engine inoperative last in 3 minutes 46 seconds. At 13:26:04 LT, both engines operation resumed to normal.
21. At 13:36:10 LT, the aircraft was on descent indicated by the reduction of the aircraft altitude from 5,000 feet.
22. At 13:47:16 LT, the aircraft was touchdown indicated by the altitude of 96.8 feet while the MAP engine was 6.56 Hg and 6.47 Hg for the left and right engine respectively. The aircraft then continued to take off as indicated by the engine MAP indicated 28.48 Hg and 28.17 Hg for the left and right engines respectively.
23. At 13:47:34 LT, the aircraft airborne indicated by the increasing of altitude and the IAS was 100 knots.
24. At 13:48:10 LT, the simulated one engine inoperative after take-off was performed indicated by the reduction of the left engine MAP by 8.05 Hg while the right engine

MAP was 25.89 Hg. The aircraft altitude was about 800 feet and the IAS was about 117 knots. The left engine MAP was maintained below 10 Hg indicating that the one engine inoperative was exercised until landing at 13:52:32 LT.

25. At 13:52:39 LT, the aircraft then continued to take off with both engines operated normally as indicated by the engine MAP indicated 24.79 Hg and 25.29 Hg for the left and right engines respectively.
26. At 13:52:47 LT, the aircraft airborne indicated by the increasing of altitude and the IAS was 101 knots.
27. At 13:53:30 LT, the simulated one engine inoperative after take-off was performed indicated by the reduction of the right engine MAP by 7.4 Hg while the left engine MAP was 25.72 Hg. The aircraft altitude was about 900 feet and the IAS was about 122 knots. The right engine MAP was maintained around 10 Hg indicating that the one engine inoperative was exercised.
28. At 13:56:56 LT, when the aircraft altitude was about 400 feet, the altitude was increasing indicating that the aircraft was making go around with simulated one-engine inoperative.
29. At 14:04:34 LT, the aircraft was touchdown indicated by the altitude of 66 feet while the MAP engine was 9.92 Hg and 8.84 Hg for the left and right engine respectively. The aircraft then continued to take off at 14:04:36 LT with both engines operated normally as indicated by the engine MAP indicated 26.93 Hg and 26.44 Hg for the left and right engines respectively.
30. At 14:04:46 LT, the aircraft airborne indicated by the increasing of altitude and the IAS was 100 knots.
31. At 14:05:27 LT, the simulated one engine inoperative after take-off was performed indicated by the reduction of the left engine MAP by 5.72 Hg while the right engine MAP was 25.24 Hg. The aircraft altitude was about 900 feet and the IAS was about 122 knots. The left engine MAP was maintained around 10 Hg indicating that the one engine inoperative was exercised until landing.
32. At 14:11:00 LT, the aircraft touchdown with the parameter NormAc was +0.14 G with the aircraft pitch was 2.42 degrees. The IAS was 90 knots. The left and right engine MAP was 7.47 Hg and 6.86 Hg respectively. In twoseconds the pitch increased to 4.33 degrees and aircraft altitude slightly increase, indicating that the aircraft was bounced.
33. At 14:11:07 LT, the aircraft touchdown with the parameter NormAc was +0.34 G with the aircraft pitch was -1.34 degrees. One second later both engines stopped indicated by the parameter engine RPM was 0 and the oil pressure dropped from around 1 to 0 psi.
34. At 14:1:18 LT, the aircraft stopped indicated by the parameter groundspeed 0 knot.
35. At 14:12:09 LT, end of recording.

1.12 Wreckage and Impact Information

The aircraft propeller marks were found on the runway and were able to be identified about 390 meters around the runway centerline and from the beginning of Runway 04. The aircraft lower fuselage marks were found about 2 meters from the propeller marks and continued to the aircraft stop position.

Figure 7: The propeller marks found on the runway

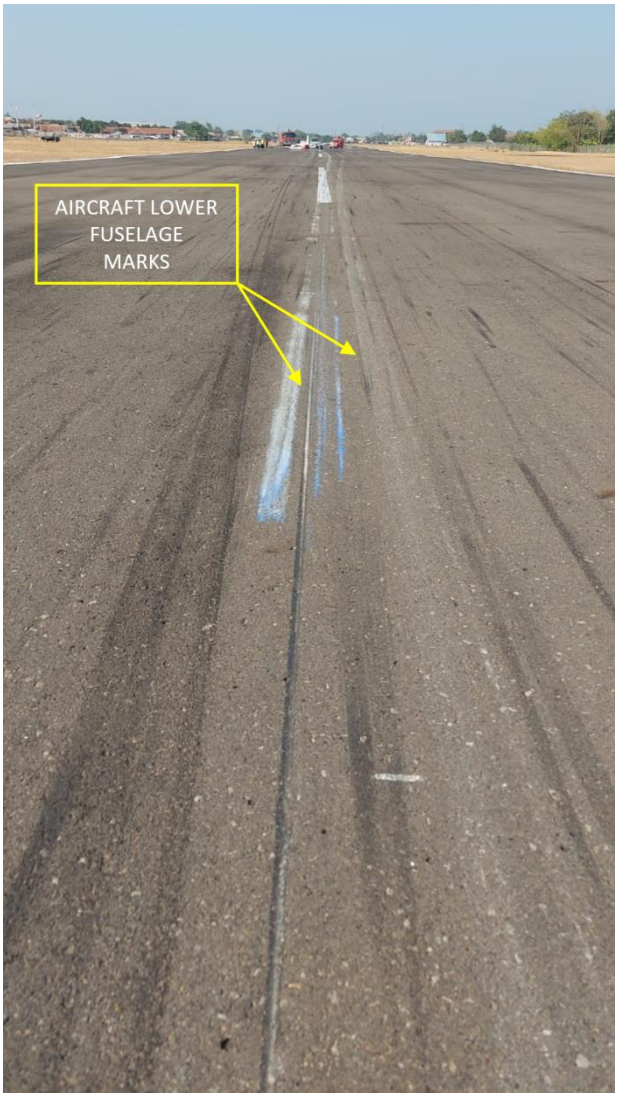

Figure 8: The aircraft lower fuselage marks found on the runway

1.13 Medical and Pathological Information

After the occurrence, the FI and student pilot underwent drug tests consisting of cocaine, methamphetamine, amphetamine, morphine, cannabinoid, and benzodiazepine. The result of the drug tests was negative.

1.14 Fire

There was no evidence of in-flight or post-impact fire.

1.15 Survival Aspects

During the aircraft landing, the Airport Rescue and Fire Fighting (ARFF) personnel noticed an unusual sound coming from the runway and saw that the aircraft was landing without landing gear.

The aircraft stopped on the runway, in front of the ARFF station. About the same time, the ATC pressed the crash bell and informed the ARFF that the aircraft crashed while

the ARFF personnel deployed to the accident site. The ARFF deployed one fire truck and one ambulance to the site.

After the aircraft stopped, the student pilot shut down the engine and switched off the master switch.

The FI opened the cockpit door and both pilots evacuated safely from the aircraft. Both pilots were evacuating using an airport ambulance to the AAA flight operation office.

1.16 Tests and Research

1.16.1 Landing Gear Up and Down Test

During the evacuation process of the aircraft, the engineer removed the battery connectors and lowered the landing gear manually in order to move the aircraft to the AAA hangar.

The investigation conducted up and down tests of the landing gear to identify any abnormalities.

On 7 October 2023, KNKT conducted up and down tests for the landing gear. This test was conducted in Hangar AAA at Cakrabhuwana Airport. The test was intended to demonstrate whether the landing gear can retract and extend normally.

The aircraft was prepared for the test with the following steps.

1. The engineers conducted a visual inspection of the aircraft to ensure that the up and down check would not result in further damage.
2. The aircraft was put on hydraulic jacks. Two hydraulic jacks were placed under each wing root and one jack was placed on the aircraft tail.
3. The jacks were extended until the aircraft was lifted off the ground.

Figure 9: The aircraft on jacks

4. The aircraft battery was connected to the aircraft system.
5. The external power receptacle was connected to the aircraft.
6. The landing gear motor CB was pushed in.
7. Both throttle levers were slightly advanced.
8. The flap switch was selected to the down position.

Figure 10: The yellow circle showed the external power source was attached to the aircraft

The test results were as follows:

1. When both master switches were placed in the ON position, the aircraft avionic system was working properly.

Figure 11: The yellow circle showed the three green lights were illuminated

2. The three green landing gear lights were illuminated normally.

Figure 12: The yellow circle indicates the three green lights and the landing gear lever states in the down position

3. When the landing gear lever was selected from the down to the up position, the landing gear was retracted. It took 4 seconds starting from the selection of the landing gear in the down position to the up position until both landing gear doors were closed and the landing gear lights were not illuminated.

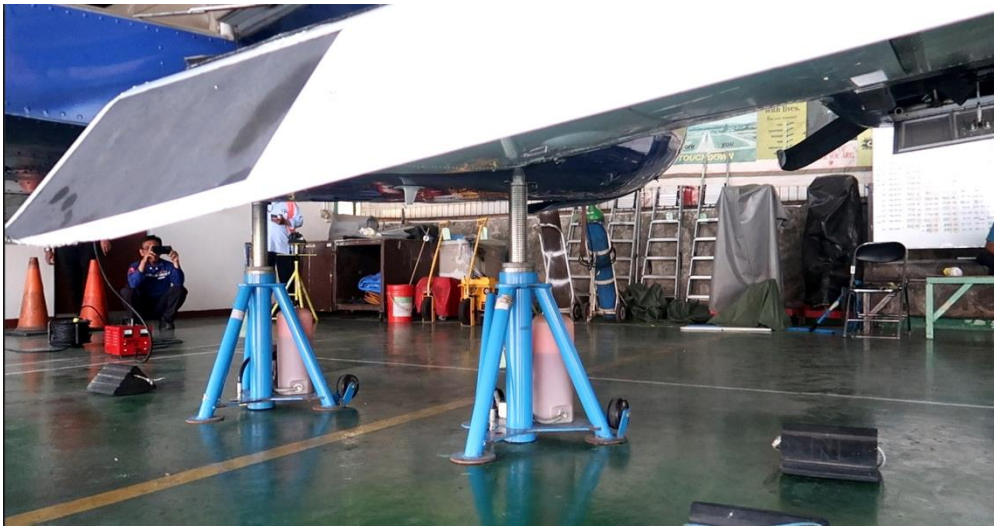

Figure 13: The landing gears were in the up position while the flap was extended

4. When the landing gear lever was selected from the up the down position, the landing gears were extended. It took 4 seconds starting from the selection of the landing gear from the up position to the down position until the landing gear doors were closed and landing gear lights were illuminated green.

Figure 14: The landing gears were in the up position while the flap was set in the up position

The up and down test of the landing gears concluded that the landing gears were operated normally.

1.16.2 Landing Gear Warning Horn and Annunciator Test

On 7 October 2023, the KNKT conducted the test for the landing gear warning horn and annunciator to identify any abnormalities.

The aircraft was configured as follows:

1. The landing gears were retracted.
2. The flap was selected for the down position.
3. The throttle levers were placed in a slightly advanced position.

The test result was as follows:

1. Both master switches were placed in the ON position, the landing gear warning horn aural warning was activated and the sound was significantly heard in the cockpit.
2. The landing gear annunciator was appearing in red color on PFD.

Figure 15: The yellow circle indicates the red warning in the PFD

The landing gear warning horn and annunciator test result showed that the warnings were activated normally as stated in the Pilot Operating Handbook (POH) and the Aircraft Maintenance Manual.

1.16.3 Landing Gear Warning Horn and Annunciator During Flight

Based on the recorded Garmin G1000 flight data log of the aircraft, the investigation conducted research on the duration of the landing gear warning horn and annunciator triggered during the flight.

To discover the number of the landing gear warning horn and annunciator triggered during the flight, the investigation examined the flight data logging of the occurrence starting from 05:10:07 UTC up to 07:12:09 UTC where the total time was 2 hours 2 minutes 2 seconds.

Referring to the Beechcraft Baron G58 Pilot Operating Handbook in Section 7, the landing gear warning horn and annunciator will be triggered by the following conditions:

1. The landing gear retracts, and
2. The throttle retarded until the MAP is below 13 in Hg manifold pressure, or
3. The flaps fully extended.

Based on the above mentioned triggering conditions, the duration of the landing gear warning horn and annunciator corresponds to the time when the manifold pressure began to decrease below 13 in Hg and the landing gears retracted.

The result of the research was as follows:

NO	START	END	DURATION	AVERAGE MAP	ENGINE AFFECTED	Possibility Exercises
1	12:53:54	12:54:21	00:00:58	11.5	Both	Stall
2	12:56:13	12:57:00	00:00:47	9.3	Both	Stall
3	12:58:44	12:59:47	00:01:03	12.4	Both	Stall
4	13:01:35	13:02:20	00:00:45	12.3	Both	Stall
5	13:03:22	13:03:53	00:00:31	11.9	Both	Stall
6	13:05:06	13:05:36	00:00:30	12.2	Both	Stall
7	13:06:31	13:07:18	00:00:47	11.4	Both	Stall
8	13:09:26	13:10:54	00:01:28	5.8	Left	Simulated one engine inoperative
9	13:12:01	13:13:16	00:01:15	6.2	Left	Simulated one engine inoperative
10	13:14:12	13:15:10	00:00:58	6.2	Right	Simulated one engine inoperative
11	13:16:45	13:17:53	00:01:08	6.0	Right	Simulated one engine inoperative
12	13:22:18	13:26:04	00:03:46	10.6	Left	Simulated one engine inoperative
TOTAL			00:13:56			
AVERAGE			00:01:10			

Figure 16: The training activities in the training area

NO	START	END	DURATION	MAP	ENGINE AFFECTED	Possibility Exercises
1	13:48:10	13:51:40	00:03:30	9.8	Left	Simulated one engine inoperative
2	13:53:30	14:03:41	00:10:11	11.1	Right	Simulated one engine inoperative
3	14:05:27	14:11:00	00:05:33	10.5	Left	Simulated one engine inoperative
TOTAL			00:19:14			
AVERAGE			00:06:25			

Figure 17: The training activities on the aerodrome traffic circuit

Conclusion:

1. In the training area, the estimation of the landing gear warning horn and annunciator was triggered 12 times with a total duration of 13 minutes and 56 seconds. The average duration of the warning horn and annunciator is 1 minute 10 seconds.
2. On the aerodrome traffic circuit, the estimation of the landing gear warning horn and annunciator was triggered 3 times with a total duration of 19 minutes and 14 seconds. The average duration of the warning horn and annunciator is 6 minute 25 seconds.
3. The landing gear warning horn and annunciator that was triggered 15 times in total.
4. On this flight, the estimation of the duration of the landing gear warning horn and annunciator that was triggered is 33 minutes and 10 seconds in total.

1.17 Organizational and Management Information

The aircraft was operated by Angkasa Aviation Academy (AAA) which had a valid Air Operator Certificate (AOC) number 141D-21. The AAA is authorized under Civil Aviation Safety Regulation (CASR) Part 141 to conduct initial pilot training consisting of private pilot training, commercial pilot training, instrument rating training, multi-engine training, flight instructor training, and CPL endorsement training.

At the time of the occurrence, the AAA operated 15 Cessna 172S and 1 Baron B58 aircraft.

The operator was in a change of management. The FI, who was the Assistant Chief Instructor, was mandated to act as the Head of the AAA while waiting for the assignment letter.

1.17.1 Crew Coordination

The crew coordination was described in the Standard Operating Procedure (SOP) of Beechcraft Baron G58 in AAA which stated as follows:

SECTION 4 – AUTOMATION AND CRWEW COORDINATION

CREW COORDINATION

During dual and mutual flights, crew coordination's are practiced throughout the operations for training purpose. The Baron G58 is certified and approved for single pilot operations.

Task Distribution is divided between Pilot Flying (PF) and Pilot Monitoring (PM) though the following table below.

Checklist Reading and Procedures	
When Aircraft is Stationary	When Aircraft is in Motion
PIC (Left seat pilot)	Safety Pilot / Flight Instructor (Right seat pilot)

Task Distribution During Normal Condition	
PF	PM
Flight Path Airspeed Control Navigation Configuration Requests Conduct of Normal Checklist (stationary) Direct other tasks as required	Communication Navigation Logging Monitoring flight path, airspeed navigation Performing Configuration Requests Conduct of Normal Checklist (in motion) Perform other tasks as directed by the PF

Note: Configuration Requests include: flaps and landing gear operations. During Manual Flight, the PM will operate the HDG/ALT/SPD bug and AFCS modes. During Autoflight with AP engaged, the PF will operate the bugs and FD modes

Task Distribution During Non-Normal Condition	
PF	PM
Flight Path Airspeed Control Navigation Configuration Requests Communication Confirming and Monitoring Actions done by PM Direct other tasks as required	Monitoring flight path, airspeed, navigation Performing Configuration Requests Conduct of Abnormal/ Emergency Checklist Perform the task as directed by the PF Navigation Logging

Note: During performance of Abnormal/ Emergency Checklist, the PF will take over the COM task, as the cognitive and attention of the PM will be directed towards checklist operations. Therefore the situational awareness of the environment, navigation, and communications are better than PM's. The PM, however is still responsible to monitor the PF's flying

Figure 18: The PF and PM task distribution

1.17.1.1 Standard Callouts

The standard callouts were described in the SOP of Beechcraft Baron G58 in AAA which stated as follows:

SECTION 4 – AUTOMATION AND CREW COORDINATION

STANDARD CALLOUTS

During all operations where Crew Coordination is exercised. It is also recommended to use a standard terminology and callouts to serve a clear, quick, and unambiguous message between pilots. The terminology to be used are as follows:

CONFIGURATION CHANGES

PF	PM
Raise the nose and begin unstick	At 85 knots, call "*UNSTICK*"
Verify the positive rate of climb on the altimeter and call *"GEAR UP"*	When positive rate of climb is indicated on the altimeter, call *"POSITIVE RATE"*
Verify the action being done	Set LDG GEAR Lever to UP Call *"GEAR UP"* When landing gear indicator lights are off, call *"GEAR IS UP"*
Setting the flaps to UP, call *"Flaps Up"* Verify the flaps to be in UP	Reply *"Flaps Up"* Set the flap handle to approach When the flaps up is set and flaps lights are extinguished, call *"Flaps Up Set"*
Setting the flaps to APH, call *"Flaps Approach"* Verify the flaps to be in APH	Reply *"Flaps Approach"* Set the flap handle to approach When the flaps approach is set and blue light is illuminated, call *"Flaps Approach Set"*
Setting the flaps to DN, call *"Flaps Down"* Verify the flaps to be in DN	Reply *"Flaps Down"* Set the flap handle to DOWN When the flaps approach is set and amber light is illuminated, call *"Flaps Down Set"*
Setting the Landing Gear to Down position, call *"Gear Down"* Verify action and Landing Gear to be in DOWN position	Reply *"Gear Down"* Set Landing Gear lever to DOWN When landing gear is verified to be DOWN, by 3 green landing light is illuminated, call *"Gear Down Set"*
Opening the Cowl Flaps, call *"Set Cowl Flaps OPEN"* Verify the Cowl Flaps Handle to be in OPEN position	Reply *"Cowl Flaps OPEN"* Set both cowl flaps handle to OPEN Call *" Cowl Flaps Open, Set"*
Closing the Cowl Flaps, call *"Set Cowl Flaps CLOSE"* Verify the Cowl Flaps Handle to be in CLOSE position	Reply *"Cowl Flaps CLOSE"* Set both cowl flaps handle to CLOSE Call *" Cowl Flaps CLOSED, Set"*

Figure 19: The configuration changes callouts

1.17.2 Simulated One Engine Inoperative

The exercise of simulated one engine inoperative was described in the AAA SOP of Beechcraft Baron G58 on section 3 which stated as follows:

Use the following power setting (only on one engine at a time) to establish zero thrust. Use of this power setting avoids the difficulties of restarting an engine and preserves the availability of power to counter potential hazards.

The following procedure should be accomplished by alternating small reductions of propeller and then throttle, until the desired setting has been reached.

1. Propeller Lever..... RETARD TO FEATHER DETENT

2. Throttle ..... SET 12 in. Hg MANIFOLD PRESSURE

NOTE

This setting will approximate Zero Thrust using the recommended One-Engine-Inoperative Climb speed.

The exercise of simulated one engine inoperative also described in the AAA Standard Operating Procedure (SOP) of Beechcraft Baron G58 on section 5 which stated as follows:

As it is required for pilot certification and proficiency purposes, no simulated engine failure may be done by cutting the mixture below 5000 feet AGL.

For simulated one engine inoperative exercise in low altitude, such as in circuit pattern may be done only by qualified instructors, and done by retarding the throttle to approx. 12 inHg.

For simulated engine failure in area exercise, do the Simulated Zero Thrust exercise found in chapter 3 of this handbook.

Engine In- Flight Shut Down may be performed if it is required in syllabus, and only in clear weather at altitude above 5000 feet AGL

Simulation of a failed engine after departure may only be done considering atmospheric condition, terrain and aircraft performance , at speed more than Vyse and altitude of at least 200 feet AGL

RECOMMENDED TECHNIQUES AND PROCEDURES FOR SIMULATED ENGINE FAILURE EXERCISE

As it may be needed for the training purpose and safety reasons, actual inflight shutdown of an engine can be avoided by using the "Simulating Zero Thrust" technique found in this chapter.

In circuit pattern, it is also acceptable to reduce the power of the inoperative engine to approximately 12 inHg. In area exercise, the Simulating Zero Thrust Technique may be used to induce a climb performance during One Engine Inoperative.

In any exercise involving a failure of an engine. This following procedure applies:

FI	*:Declare "ENGINE FAILURE"*
FI	*:Set THROTTLE and PROP for selected engine*
Student	*:Identify ("LEFT/RIGHT ENGINE FAILURE")*
FI	*:Keep hands on the failed throttle*
Student	*:Do procedures or maneuvers as required*
FI	*:On final approach, declare "LANDING OR GO-AROUND ON BOTH ENGINES" if One Engine Inoperative landing is to be made. If the exercise is go around with one engine inoperative, declare "GOAROUND WITH ONE ENGINE"*

1.17.3 Velocity Minimum Controllable Aircraft

The exercise of Velocity Minimum Controllable Air (VMCA) was described in the AAA SOP of Beechcraft Baron G58 on section 3 which stated as follows:

A. VMCA Demo Prequisites
1) Ensure altitude minimum 5000 AGL
2) No clouds in vincinity
3) Not above building
4) Not above town
5) No other aircraft
6) Not facing the sun
7) No terrain (above an open area)

B. Verify that:
1) Landing Gear……UP
2) Flaps..... UP
3) Airspeed..... Above 88 KIAS (VSSE)

C. Initiate Actions:
1) PROPELLERS (BOTH).....HIGH RPM
2) Throttle (simulated inoperative engine).....IDLE
3) Throttle (other engine).....MAXIMUM MANIFOLD PRESSURE
4) Airspeed.....REDUCE APPROXIMATELY 1 KNOT PER SECOND

CAUTION

Use rudder to maintain directional control (heading) and ailerons to maintain 5° bank towards the operative engine (lateral attitude).

At any time, one or more of the following occurrs, immidiately initiate recovery:
A. Speed reaching VMCA / red line (84 KIAS)
B. Aerodynamic stall buffet
C. Inability to maintain heading
D. Stall warning

Recovery:

A. Throttle – Operative Engine.....IDLE

B. Pitch attitude.....DECREASE

C. Throttles (BOTH).....OPEN STIMULTANTEOUSLY

D. Airspeed.....INCREASE TO MINIMUM VYSE

E. Altitude.....RESUME TO ORIGINAL ALTITUDE

1.17.4 Stall Exercise

The exercise of stall was described in the AAA SOP of Beechcraft Baron G58 on section 3 which stated as follows:

PRE STALL CHECK

A. Ensure altitude minimum 3000 AGL
B. No clouds in vincinity
C. Not above building
D. Not above town
E. No other aircraft
F. Not facing the sun
G. No terrain (above an open area)

CLEAN STALL

A. Throttle – IDLE
B. Mixtures – RICH
C. Propeller – FULL FWD
D. Speed – ± 90 kts
E. Throttle – 12" MAP
F. Maintain ALTITUDE, Maintain DIRECTION, WING LEVEL
G. AS STALL OCCURS, RECOVER PROMPTLY WITH MINIMUM ALT LOSS
H. Simultaneously REDUCE AoA & Increase Throttle to FULL
I. Maintain ORIGINAL ALTITUDE, Engine Instrument – CHECK

DIRTY STALL

A. Throttle – 12" MAP
B. Mixtures – RICH
C. Propeller – FULL FWD
D. Speed – BELOW 152 kts
E. Flaps – APPROACH
F. Gear – DOWN
G. Speed – BELOW 122 kts
H. Flaps – DOWN
I. Maintain ALTITUDE, Maintain DIRECTION, WING LEVEL
J. As STALL Occurs, Recover PROMPTLY with Minimum ALT LOSS
K. Simultaneously REDUCE AoA & Increase Throttle to FULL
L. Speed above 100 kts,
FLAPS – UP
LANDING GEAR - UP
M. Maintain ORIGINAL ALTITUDE, Engine Instrument – CHECK

DEPARTURE STALL (POWER-ON STALL)

A. Throttle – 12" MAP
B. Set Takeoff or Departure Configuration as Required
C. Takeoff Configuration: Gear – DOWN, Flaps – UP

D. Departure Configuration: Gear – UP, Flaps – UP
E. Mixtures – RICH
F. Propeller – FULL FWD
G. Speed – ± 90 kts
H. Maintain Heading or Establish 15º Bank, as Required
I. Transition Slowly to 15º Pitch-Up, Increase Throttle – 21" MAP
J. As STALL Occurs, Recover PROMPTLY with Minimum ALT LOSS
K. Simultaneously REDUCE AoA, Level WINGS & Increase Throttle to FULL
L. Establish POSITIVE Rate of Climb, Clean UP & Accelerate to 105 kts
M. Maintain ORIGINAL ALTITUDE, Engine Instrument – CHECK

APPROACH STALL (POWER-OFF)

A. Mixtures – RICH
B. Speed – BELOW 152 kts
C. Flaps – APPROACH
D. Gear – DOWN
E. Propellers – FULL FWD
F. Speed – BELOW 122 kts
G. Flaps – FULL DOWN
H. Establish Descent Speed – 95 kts, VSI – 500 fpm DOWN
I. Maintain Heading or 15º Bank as Required
J. Reduce Throttle – 12" MAP
K. As airspeed reduce, maintain heading and Vertical Speed
L. As STALL Occurs, Recover PROMPTLY with Minimum ALT LOSS
M. Simultaneously REDUCE AoA, Level WINGS & Increase Throttle to 25" MAP
N. Flaps – UP
O. Establish POSITIVE Rate of Climb, Gear – UP & Accelerate to 105 kts
P. Maintain ORIGINAL ALTITUDE, Engine Instrument – CHECK

1.17.5 Personnel Duties and Responsibilities

The duties and responsibilities of the personnel in the AAA were described in the Training Procedure Manual (TPM) as follows:

Chapter 2.2.1 Head of Angkasa Aviation Academy

Subordinates:

1. *Safety, Security and Quality Manager.*
2. *Chief Flight Instructor.*
3. *Maintenance Manager.*
4. *Support Manager.*

Requirements:

To be eligible for designation as a Head of Angkasa Aviation Academy, a person must meet

the following requirements:

1. *hold or held a commercial pilot licence or an air transport pilot licence;*
2. *have a minimum of five-year experience as a pilot;*

3. *experienced as a trainer;*
4. *experienced as part of managerial organization;*
5. *has satisfactorily completed safety management training course.*

Main Tasks:

To monitor all kinds of training program and to control the quality of service and training material by processing and developing the school staff capability.

Duties and Responsibilities:

The Head of Angkasa Aviation Academy has the following duties and responsibilities:

1. *To make annual working and budget plan for the whole sections within the school by focusing to most concept [mission, objectives, strategy, tactic] to support management policy, and to prepare the annual activity plan reports associated with the operation of School to the Director of ASS;*
2. *To monitor the performance of all kinds of training related to the internal and external need of the school;*
3. *To coordinate the promotion of training program and increasing School facilities toward the external side to increase the school capability;*
4. *To observe and coordinate the administration activity as well as School funding process, including build and develop the human resources within School so as to be suitable for the competence of the company;*
5. *To approve and issue, or delegate the authority for the issuance of Course Graduation Certificate;*
6. *To act all directives from Company Board promptly and maintain regular face -to- face, written, or telephone contact with the Director of ASS;*
7. *To maintain a strong commitment to the implementation and preservation of safety programs, values and ethics, including:*
    1) *Security, Discipline and efficient in everything;*
    2) *Punctuality in every activity must be fulfilled;*
    3) *Compliance in implementing SOPs, Task Responsibilities, efficiency and hard work;*
    4) *And ensure the investigation of accidents or incidents involving members of the ASS aircraft, when requested by the Directorate General of Civil Aviation, the police station, or the NTSC are carried out.*
8. *To ensure that built-in control, guidance, improvement, appraisals, welfare and efficient working of all staff labor in the area of his responsibility are carried out;*
9. *To perform all other acts reasonable and necessary to accomplish his/her primary function as requested by the Director of ASS;*
10. *Conduct Assesment to AAA SSQM, Chief Instructor, Maintenance Manager and Support Manager candidate*

Chapter 2.2.4 Assistance Chief Instructor

Accountable To:

Chief Instructor

Subordinates:

1. *Check Instructor.*
2. *Flight Instructor.*
3. *Ground Instructor.*
4. *Group Leader Flight Operation.*
5. *Group Leader Ground Operation.*

Requirements:

To be eligible for designation as an Assistant Chief Instructor in the Angkasa Aviation Academy, a person must meet the following requirements:

1. *Hold a current Commercial Pilot License or Air Transport Pilot License with Multi*
2. *Engine Land Class Rating;*
3. *Serve as Flight Instructor level 4 at AAA;*
4. *Meet the recent flight experience as describe in CASR 61.57 for the category and class of aircraft being used for flight training purposes;*
5. *Passed assessment by SSQM;*
6. *Passed Instructional Evaluation;*
7. *Have logged at least: 1500 hours of PIC and 1000 hours of instructional flight hours;*
8. *Have at least 2 years acting as ground instructor.*

Main Tasks:

1. *To control and ensure the quality training system and in accordance with Training Procedure Manual (TPM), respond the company wishes and provide the human resources that is competent in teaching field and providing learning system;*
2. *Acting as Assistant Chief Instructor for PPL, CPL, IR, ME, FIC, Conversion Course and Special Course at Angkasa Aviation Academy;*
3. *Carry out tasks and authority according to the workload received based on the Syllabus and Training Course Outline aims to standardize and for each instructor responsible in the part of training and any deviations that hinder quality improvement or increase training from each part of training must be reported to the Chief Instructor.*

Duties and Responsibilities:

The Assistant Chief Instructor has the following duties and responsibilities:

1. *To be aware of the vision, missions, objectives and quality policy statements of the school, using them as guidelines in the planning, structuring, and teaching of each course;*
2. *To ensure student pilot ground and flight training of school are conducted in accordance with the standards, procedures and regulations set out in this*

TPM and the relevant legislation as amended from time to time;

3. *To certify each student's training record, graduation certificate, stage check and endof-course test report, recommendation for course completion, and application;*
4. *To conduct that each certified flight and ground instructor an initial Instructional Evaluation to that instructor being assigned instructing duties in the school ' approved training course, and thereafter a recurrent Instructional Evaluation in accordance to TPM 4.2.4; 4.2.5; 4.2.6;*
5. *To ensure the student under their control maintain the highest level of competency, currency [training techniques, procedures, standards and general flight practices];*
6. *Must be available at the Pilot School, or if away from the pilot school, be available by telephone, radio, or other electronic means during the time that training is given for an approved training course;*
7. *To delegate authority for conducting stage checks, end-of-course tests, and flight instructor Instructional Evaluation to a check instructor;*
8. *To brief, authorize, and revoke authorization of teaching to Instructors based on evaluation on AAA defined standard upon delegation from the Chief Instructor;*
9. *To manage, approve, the person and flights performing flight training activities within the AAA scope of operations;*
10. *To coordinate in arranging training curriculum syllabus according to the need and defined requirements, including mobilize the readiness of training equipment, media or tools to maximize the accomplishment of training;*
11. *To report incident that contravenes the School TPM and any relevant legislation as amended from time to time, including maintain a strong commitment to the implementation and perpetuation of the safety program, values and ethics;*
12. *To delegate duties to personnel directly under his control to achieve completion of work within the required time span;*
13. *To carry out regularly flying checks of the trainee pilots to ensure that the school is imparting a standardized flying training;*
14. *To participate with Safety Improvement and policy managed by the SSQ Manager*
15. *Implement Safety Management System based on the principles:*
    1) *Safety, Discipline and efficient in everything;*
    2) *Punctuality in every activity must be fulfilled;*
    3) *Compliance in implementing SOPs, Duty Responsibilities, efficiency, and regulatory requirements.*
16. *To accomplish a Flight Instructor Refresher Course every year.*

Chapter 2.3.2 Chief Instructor

Accountable To:

1. *CHIEF INSTRUCTOR.*
2. *ASSISTANT CHIEF INSTRUCTOR.*

Requirements*:*

To be eligible for designation as a flight instructor in the Angkasa Aviation Academy, a person must meet the following requirements:

1. *Hold a valid certificate flight instructor;*
2. *Meet the recent flight experience as describe in CASR 61.57 for the category and class of aircraft being used for flight training purposes;*
3. *Passed Instructor Hire Process in accordance to TPM 4.2.*
4. *Hold a valid medical certificate.*
5. *Completed briefing and basic indoctrination by Chief Instructor.*

Main Tasks:

To instruct students in accordance with the philosophy, principles and policies of the

School, the curriculum of the training, the provisions of the education code, and the rules and regulations of the Company Angkasa Aviation Academy and DGCA.

Duties and Responsibilities*:*

The Flight Instructor has the following duties and responsibilities:

1. *To be aware of the vision, missions, objectives and quality policy statements of the school, using them as guidelines in the planning, structuring, and teaching of each course;*
2. *To improve instruction and to periodically evaluate methods of teaching the content and objectives of each course;*
3. *To provide feedback, recommendation, or advice to the trainee after a completion of flight training.*
4. *To provide students, at the beginning of each course, with a course overview outlining the content, requirements, testing and grading procedures of the course;*
5. *To maintain an attitude of ready cooperation and assistance between personnel within the school to secure common objectives.;*
6. *To perform all other acts reasonable and necessary to accomplish his/her primary function as requested by the Chief Instructor;*
7. *Conduct flight training in accordance with CASR Part 61, 67, 91, 141, 830 and published curriculum and procedures;*
8. *Monitoring student's progress and report to Chief Instructor or Assistant Chief Instructor;*
9. *Implement safety management system;*
10. *Any other duties assigned by the Chief Instructor or Assistant Chief Instructor;*

Where a change in flight instructors occurs, the new instructor must be given a

detailed briefing on the trainee's progress to the point of hand-off.

1.17.6 Flight Hour Limitation and Rest Requirements

The flight hour limitation was described in the TPM as follows:

Chapter 4.4.3 FLIGHT HOUR LIMITATION

A Flight Instructor performing a flight instruction is imposed to the following limit;

Duration	Limitation
Within consecutive 24 hours	8 Flight Hours, comprising: • Maximum 3 hours of A stage • If combination of A stage and other than A stage: 5 hours • Stages other than A stage: 8 hours *(includes flight and FTD hours)*
Within 7 consecutive days	30 hours
Within 1 calendar month	110 hours
Within 12 consecutive months	1050 hours
For specific details regarding the flight hour and duty limitations, refer to AAA Operation Manual	
If a Flight Instructor is also flying in other company than AAA, the combination of flight hours from both flying activity is included in the limitation of this chapter	

The AAA Operation Manual (OM) described the rest requirements for the crew member as follows:

Chapter 5.5.7 Crew Member Rest Requirements

A. Rostered Day Off (RDO)

B. All Flight Insructor must relieved from all further duty for at least 24 consecutive hours within any 7 calendars days. This periode of 24 consecutive hours will commence after a Flight Duty Periods (FDP).

C. Minimum Rest Periods Between Two Flight Duty Periods

a) The minimum rest period must given to each crew who has performed an assignment involving flying duty and before the next flight duty period.

D. During rest period, the flight instructor must not be given any assignment by the company.

a) For FTD < 14 Hours : 9 Hours rest period.

b) However, the minimum rest period is not to be used repeatedly in succesion to a pilot, to avoid chronic fatigue deterioriation of performance. 12 hours is the ideal rest time.

c) Rest period of between 9-12 hours are not to be applied to a pilot for more than 2 times in a row. After 2 rest periods of between 9-12 hours, a rest period of more than 12 hours, or a Day Off must be given.

d) *A deadhead to a station where the pilot is performing the duty, under company provided transportation, such as travelling from JKT to CBN / CJN, where a Flight Duty is to be undertaken, is considered duty time. The transportation from training base to home town, after duty is completed, does not count as Duty Time.*

Chapter 5.5.8 Begin/End of The Rest Period

Flight Duty Time is considered to begin	Flight Duty Time is concidered to end
1 (one) hour before planned departure time	1 (one) hour after last block on time

Rest Time Period starts from	Rest Period is considered end from
30 minutes after duty period ends	30 minutes before the duty period starts

Chapter 5.5.9 Example of Flight Duty Time Roster

Here shown an example of a crew roster duties and how the rest managed and complied.

←17.30	06.30	07.00	08.00	12.00	13.00	16.00	17.00	17.30 →
+9h	30 min	1h	4h	1h	3h	1h	30 min	+9h
Rest	Travel Time	Preflight	Start flight (B. OFF)	End flight (B.ON) REST	Start Flight (B.OFF)	End Flight (B.ON)	Travel Time	Rest

Remarks:

A. *All times are local.*
B. *The pilot is scheduled to fly at 0800 local time, he is to begin his duty and arrive at the airport at 0700, 1 hour before the flight is scheduled.*
C. *The flight commences and take 4 hours to complete, the block on time is at 1200 LT.*
D. *Between 1200 to 1300 LT, the pilot takes rest.*
E. *By 1300 to 1600, the pilot is flying again.*
F. *At 1600, the last block off time, 1 more hour is added to the duty time for post flight activities, such as documentation, briefing, or post flight walk around.*
G. *By 1700, the duty cycle is completed, and the pilot is relieved from duty.*
H. *30 minutes past 1700 is given for the crew transportation to the accommodation.*
I. *At 1730, by the arrival to the accommodation, the rest period begins for at least 9 hours, up to the next duty assignment*

Conclusion:

A. *The FDT is (from 0700LT to 1700LT) 10 hours.*
B. *The Block Time is (4h+3h) 7 hours.*
C. *The rest period is (from 1730LT to 0630LT the next day) 13 hours*

In simple words:

From 1 hour before first planned departure to 1 hour after last actual arrival is 14 hours

Within 24 hours, maximum Block Time is 8 hours

From the last block on to the next block off is 12 hours minimum (maximum 2 times in a row)

From the last block on to the next block off is 15 hours (ideal)

Within 7 days, must have 1 day off (free of duty)

1.17.7 Fasting Policy

The AAA OM described the fasting condition as follows:

Chapter 5.3.11 Fasting

Fasting when flying has and will remain a sensitive issue. This serves as information to all flight crew who observe fasting. The common effects of fasting is: Low blood sugar, drowsiness, lack of emotional control, easily tired, etc. It is company policy that fasting cannot be banned / restricted as is a religious right. It is however, the crew's responsibilities to monitor his well- being and report to the SAFETY department and Flight Operations if he sees that his physical condition declines.

HYPOGLYCAEMIA (Low Blood Sugar Level) had been known to cause pilot incapacitation.

Low blood sugar (hypoglycaemia) can occur spontaneously on any occasion (for example through the process of fasting). Symptoms of hypoglycaemia begin when the blood sugar level drops to 60 mg% (decrease of 30-40 mg% from normal level) and this condition could cause a decrease in brain function whenever blood sugar level drops to 50 mg%. This hypoglycaemic condition will affect the performance of the pilot. Physical Symptoms Related to Low Blood Sugar:

A. Weakness

B. Tremors

C. Dizziness

D. Lethargy

E. Unconsciousness

F. Dehydration

G. Fatigue

H. Hypoxia

Degraded Performance Symptoms Related to Low Blood Sugar:

A. Increasing irritability

B. Impaired judgement

C. Slow / improper decision making

D. Diminished checklist discipline

E. Poor communications

F. Poor crew interaction

G. Manual handling and Instrument Flying Skills deteriorated

1.18 Additional Information

1.18.1 The Alarm Desensitization

Friedman-Berg et al. (2008)[6] stated that the nuisance alerts can desensitize people toward the alert and lead to slower responses to real alerts. At worst, they distract controllers at critical moments, increase alert desensitization, and decrease trust in the automation.

The research stated that the sequence of events in a model alert situation is as follows:

1. The controller, busy with many operational tasks, is unaware that a potentially hazardous situation is developing. Alternatively, the controller may be aware of the situation but may underestimate its severity or urgency.
2. The situation reaches a critical point and the alert activates.
3. The alert focuses the controller's attention on the situation.
4. The controller decides how to respond, takes the necessary actions, and the pilot responds appropriately.
5. The situation is resolved, and the alert is deactivated.

Alert desensitization also could lead to alarm fatigue which occurs when busy workers with many operational tasks which exposed to numerous frequent safety alerts and as a result in longer response times or to missing important alarms.

In a busy situation with many operational tasks, a high number of nuisance alerts also creates workload and distractions. The workload is defined as the amount of work to be done, especially by a particular person or machine in a period of time. The high workload means that the amount of work to be done was increased significantly over a period of time. The combination of high workload and alarm desensitization leads to longer response times or missing important alarms which may result in an unintentional error. In addition, when operational personnel become desensitized, they are more likely to overlook genuinely hazardous situations because they become accustomed to treating most as nuisances.

1.18.2 Attention Failure

Reason (2016)[7] categorized several unintentional errors in the error mode, where one of them was described as follows:

Slips and Lapses

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[6] Friedman-Berg, F., Allendoerfer, K., & Pai, S. (2008). Nuisance alerts in operational ATC environments: Classification and frequencies. The full article can be accessed in https://hf.tc.faa.gov/publications/2008-nuisance-alerts-in-operational-atc-environments/

[7] Reason, J. (2016). Organizational Accidents Revisited. https://doi.org/10.4324/9781315562841

These are actions-not-as-planned. Absent-minded slips arise from inattention. Lapses are failures of memory – when we forget to carry out an intended action or forget that we have already performed a particular action.

Reason (2008)[8] highlighted that slips and lapses are subdivided into three main types: recognition failures, memory failures, and attention failures.

Attention Failures

As noted earlier, attention is a limited resource. Direct it at one thing and it is withdrawn from another. When attention is 'captured' by something unrelated to the task in hand, actions often proceed unintentionally along some well-trodden pathway: Strong habit intrusions.

Strong habit intrusions: Approximately 40 per cent of all absentminded slips are of this kind. They take the form of intact, well organized sequences that recognisably belong to some activity other than the one that is currently intended. This other activity is judged as being recently and frequently engaged in, and as sharing similar, locations, movements and objects with the intended actions.

Absent-minded slips are most likely to occur in highly familiar and relatively unchanging surroundings - kitchens, bathrooms, bedrooms, offices and the like - and during the performance of well-practised tasks that were rated as being recently and frequently performed, and largely automatic in their execution.

Attention could be categorized into several terms, Harris (2011)[9] described the kind attention as follows:

- *Selective Attention – the selection for further processing, of sensory inputs and central processing events.*
- *Focused Attention – ignoring of certain inputs to focus on inputs and events associated with the chosen task.*
- *Divided Attention – the concurrent monitoring and processing of inputs and events associated with two or more tasks.*
- *Sustained Attention – the process of attending to relevant inputs and events over a sustained period.*

Human has the capability to divide attention which allows them to be more efficient in day-to-day activities. Nevertheless, the ability to attend to multiple stimuli and do various tasks at a time does have its limits. When the limits are achieved, the efficiency of doing the actions is decreased, and almost certainly performs poorly.

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the KNKT approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

[8] Reason, J. (2008). The Human Contribution. https://doi.org/10.1201/9781315239125
[9] Harris, D. (2011). Human Performance on the Flight Deck. https://doi.org/10.1201/9781315252988

2 ANALYSIS

Prior to the departure and during the training exervise, there was no record or report of aircraft system malfunction including the landing gear system. The investigation has carried out a test and examination of the landing gear system, and found that the system was in good condition. The flight hour limitation and rest requirement for FI and the second student pilot were in accordance with requirement standard. In addition, the weather during the training exercise was considered good. Therefore, the analysis will focus on alarm desensitization and pilot attention.

2.1 The Alarm Desensitized

The aircraft landed with gear up conditions and both pilots realized that the landing gear was not lowered after the touchdown. The FI recalled that the landing checklist had not been executed and the landing gear lever had not been lowered.

Based on Baron G58 Pilot Operating's Handbook (POH), the landing gear system had warning horn and [gear up] annunciation to alert the pilots if the landing gear was on wheels-up condition. Those warning and alert active when either throttle is retarded and the Manifold Absolute Pressure (MAP) is below 13 in Hg or if the flaps are fully extended. The test of landing gear system conducted after the occurrence showed that the landing gear mechanism and the warning system were normal.

On the day of the occurrence, the multi-engine training exercise consisted some exercises that required the MAP to be reduced to below 13 in HG. This included the simulated one-engine inoperative by reducing one of the power levers to a near idle position (below 13 in Hg manifold) and maintaining the propeller pitch in a full forward position (high propeller Rotation per Minute (RPM)). Therefore, that condition would activate the landing gear up warning horn and [gear up] annunciation. The Baron G58 POH described that during one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit. Advancing the throttle to above 13 in HG will not represent the simulated one-engine inoperative. Therefore, during the simulated one-engine inoperative exercise, the horn cannot be silenced. It was also confirmed by the FI that during simulated one-engine inoperative exercise, the landing gear warning horn and [gear up] annuinciation were active.

The last exercise prior to the occurrence was simulated one-engine inoperative and the Garmin G1000 flight data logging revealed that the left engine MAP was reduced below 13 in Hg just after the aircraft airborne. Therefore, after the aircraft was airborne and the landing gear was retracted, the warning horn and [gear up] annunciation should have been active. The aural warning and visual alert were remained until the aircraft touched down with wheels up condition.

In total, during the flight with the second student pilot, the Garmin G1000 recorded 15 times of the MAP below 13 in Hg with the landing gear retracted. That condition activated the landing gear up warning horn and [gear up] annunciation with a total of 33 minutes and 10 seconds. This duration could have created a nuisance to the pilots. According to the Friedman-Berg et al. (2008), repetitive nuisance alerts can cause desensitization, which deteriorates people sensitivity to the alert and overlook

genuinely hazardous situations because they become accustomed to treating most as nuisances.

The repetitive nuisance alert from multiple activation of the landing gear up warning horn and [gear up] annunciation which did not pose an actual threat during exercise, had made the FI and second student pilot desensitized.

The landing gear warning which considered as defense of the unintentional error would not be effective if the pilot became desensitize. The investigation did not find any procedure to verify the actual threat of the landing gear warning during the flight exercise. Therefore, the absence of that procedure might increase the possibility of pilot becoming desensitize and overlook the actual hazardous of the gear up condition during the landing approach.

2.2 Pilots Attention

On the occurrence flight, the FI acted as Pilot Monitoring (PM) and the second student pilot acted as Pilot Flying (PF). According to the Standard Operating Procedure (SOP) of Beechcraft Baron G58 developed by the aircraft operator described that when the aircraft was in motion, the FI had task to read the checklist. The SOP also described that during normal conditions, the PF had task to request aircraft configuration including asking to read the checklist and the PM perform the configuration request. The Baron G58 Pilot Operating's Handbook (POH) described that Before Landing Checklist contained task to ensure that the landing gear was down. Therefore, during the landing approach, the FI who also acted as PM should read the Before Landing Checklist and lowered the landing gear when requested by the second student pilot, who acted as PF.

In all three previous touch and go exercise and one go around maneuver, the FI read the Before Landing Checklist and lowered the landing gear. However, during the last landing approach the FI lapsed to read the Before Landing Checklist and the second student pilot lapsed to request to lower the landing gear.

The flight hour limitation and rest requirement for FI and the second student pilot were in accordance with the AAA Training Procedure Manual (TPM) and AAA Operation Manual (OM). The investigation considered that the scheduled flight duty/exercise and the scheduled rest of the FI and the second student pilot did not contribute to degrade their performance.

At the day of the occurrence, the FI who as on fasting condition had another task to attend management meeting which was rescheduled to be conducted after completing the flight exercise with the second student pilot. The FI also had an additional unplanned recurrent flight for another FI who had the rating expired, meaning that the FI experienced an additional workload. According to the OM AAA, fasting condition that lowering the blood sugar level might degraded pilot performance including diminished checklist discipline. Therefore, the increasing workload of the FI while fasting considered degrading his performance.

During the third touch and go exercise with simulated one engine-inoperative, the approach unstabilized and the student pilot made a go around maneuver. This condition made the second student pilot and FI focused to ensure the aircraft stabilized during the next approach landing maneuver. In addition, the additional task other than

flight training that should be done after the flights led the FI to become divided in the attention to the current flight progress. The FI ability to attend to multiple stimuli and do various tasks at a time did have its limits, especially during the degraded performance. When divided attention occurs, the efficiency of doing multiple tasks decreases.

The degrading performance as a result of fasting conditions and multiple tasks that led to the divided attention of the FI contributed to the lapsed reading of the before landing checklist, and too focus on stabilizing the aircraft might have made the second student pilot lapsed to request to lower the landing gear.

3 CONCLUSIONS

3.1 Findings

The findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

In this occurrence, the KNKT identified several findings as follows:

1. The aircraft had a valid Certificate of Airworthiness (C of A) and a valid Certificate of Registration (C of R).
2. The landing gear of the aircraft was retractable and can be controlled by a two-position switch on the right side of the pilot's subpanel.
3. The landing gear system had warning horn and [gear up] annunciation to alert the pilots if the landing gear was on wheels-up condition. Those warning and alert active when either throttle is retarded and the Manifold Absolute Pressure (MAP) is below 13 in Hg or if the flaps are fully extended.
4. Prior to the departure and during the training exervise, there was no record or report of aircraft system malfunction including the landing gear system. The investigation has carried out a test and examination of the landing gear system and found that the system was in good condition.
5. Both pilots held valid licenses and first-class medical certificates. The Flight Instructor (FI) had a valid multi-engine flight instructor certificate.
6. The FI was the Chief Instructor Assistant and three days prior to the occurrence was appointed to act as Head of Angkasa Aviation Academy (AAA). The FI also worked as airline pilot with flight duties normally conducted on the weekends.
7. The office hour for the FI was started at started at 0800 LT and finished at 1700 LT. The calculation of rest period of the FI prior to start his duty at the day of the occurrence was 13 hours and 30 minutes.
8. One day prior to the occurrence, the second student pilot went to the training center but did not have a flight training schedule and the calculated rest period of the second student pilot was more than 12 hours.
9. The FI who as on fasting condition had another task to attend management meeting which was rescheduled to be conducted after completing the flight exercise with the second student pilot.
10. The FI had an additional unplanned recurrent flight for another FI who had the rating expired, meaning that the FI experienced an additional workload.
11. The scheduled flight duty/exercise and the scheduled rest of the FI and the second student pilot were in accordance with the AAA Training Procedure Manual (TPM) and AAA Operation Manual (OM) and considered not to contribute degrading their performance.

12. On the day of the occurrence, the multi-engine training exercise included simulated one-engie inoperative that required the MAP to be reduced to below 13 in HG. Therefore, that condition would activate the landing gear up warning horn and [gear up] annunciation. According to the FI, during the simulated one-engine inoperative exercise the landing gear warning horn and [gear up] annuinciation were active.
13. Baron G58 POH described that during one engine operation, the landing gear warning horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit. Advancing the throttle to above 13 in HG will not represent the simulated one-engine inoperative, which means that the warning horn cannot be silenced during the exercise.
14. In total, during the flight with the second student pilot, the Garmin G1000 recorded 15 times of the MAP below 13 in Hg with the landing gear retracted. That condition activated the landing gear up warning horn and [gear up] annunciation with a total of 33 minutes and 10 seconds.
15. The multiple activation of the landing gear up warning horn and [gear up] annunciation could have created a nuisance to the pilots.
16. According to the Friedman-Berg et al. (2008), repetitive nuisance alerts can cause desensitization, which deteriorates people sensitivity to the alert and overlook genuinely hazardous situations because they become accustomed to treating most as nuisances.
17. The last exercise prior to the occurrence was simulated one-engine inoperative and the Garmin G1000 flight data logging revealed that the left engine MAP was reduced below 13 in Hg just after the aircraft airborne. The aural warning and visual alert were remained until the aircraft touched down with wheels up condition.
18. The repetitive nuisance alert from multiple activation of the landing gear up warning horn and [gear up] annunciation resulted in desensitization which made the actual hazardous of the gear up condition during the landing approach was overlooked.
19. The investigation did not find any procedure to verify the actual threat of the landing gear warning during the flight exercise. Therefore, the absence of that procedure might increase the possibility of pilot becoming desensitize and overlook the actual hazardous of the gear up condition during the landing approach.
20. On the occurrence flight, the FI acted as Pilot Monitoring (PM) and the second student pilot acted as Pilot Flying (PF).
21. According to the Standard Operating Procedure (SOP) of Beechcraft Baron G58 developed by the aircraft operator described that when the aircraft was in motion, the FI had task to read the checklist.
22. SOP of Beechcraft Baron G58 described that during normal conditions, the PF had task to request aircraft configuration including asking to read the checklist and the PM perform the configuration request.

23. Baron G58 Pilot Operating's Handbook (POH) described that Before Landing Checklist contained task to ensure that the landing gear was down. Therefore, during the landing approach, the FI who also acted as PM should read the Before Landing Checklist and lowered the landing gear when requested by the second student pilot, who acted as PF.
24. In all three previous touch and go exercise and one go around maneuver, the FI read the Before Landing Checklist and lowered the landing gear. However, during the last landing approach the FI lapsed to read the Before Landing Checklist and the second student pilot lapsed to request to lower the landing gear.
25. During the third touch and go exercise with simulated one engine-inoperative, the approach unstabilized and the student pilot made a go around maneuver. This condition made the second student pilot and FI focused to ensure the aircraft stabilized during the next approach landing maneuver.
26. The additional task to attent management meeting other than flight training that should be done after the flights led the FI to become divided in the attention to the current flight progress
27. The degrading performance as a result of fasting conditions and multiple tasks that led to the divided attention of the FI contributed to the lapsed reading of the before landing checklist, and too focus on stabilizing the aircraft might have made the second student pilot lapsed to request to lower the landing gear.

3.2 Contributing Factors

Contributing factors is defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident.

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability. The presentation of the contributing factors is based on chronological order and not to show the degree of contribution.

The KNKT concluded the contributing factors as follows:

- The repetitive nuisance alert from multiple activation of the landing gear up warning horn and [gear up] annunciation resulted in desensitization which made the actual hazardous of the gear up condition during the landing approach was overlooked.
- The degrading performance as a result of fasting conditions and multiple tasks that led to the divided attention of the FI contributed to the lapsed reading of the before landing checklist, and too focus on stabilizing the aircraft might have made the second student pilot lapsed to request to lower the landing gear.

4 SAFETY ACTION

At the time of issuing this Final Report, the KNKT had been informed of several safety actions resulting from this occurrence. The safety actions are as follows:

1. On 9 October 2023, the Chief of Safety, Security, and Quality published a Safety Notice to Pilots No. 01/AAA-SSQ/SN/X/22023 "Fasting Policy" for all pilots including Flight Instructor (FI) and student pilot. The notice contains information and recommendations related to the effect of fasting on human performance. The notice reminded that FI who are fasting are not allowed to perform flight training activities except in the backseat for instructional evaluation but are allowed to do flight simulator training for a maximum of 5 hours per day. Student pilots who are fasting, are only allowed to do flight training or flight simulator training maximum of 1 (one) stage per day.
2. On 20 October 2023, the Chief of Safety, Security, and Quality published a Safety Notice to Pilots No. 02/AAA-SSQ/SN/X/22023 "Operating Handphone Inflight" for all pilots. The notice contains information and recommendations related to the effect of operating mobile phones during flight training. The notice reminded the FI to turn off mobile data (airplane mode) and silence the handphone during flight.
3. On 7 October 2024, KNKT issued safety recommendation to the aircraft operator as follows:

   04.O-2023-15.01

   The FI who was the Assistance Chief Instructor and acted as Head of AAA, on the day of the occurrence had scheduled to conduct training flights and management meetings. The FI also conducted unscheduled recurrent flight for another FI. The FI was fasting. The training flights and the management meeting might create a significant workload for the FI. The fasting might degrade the human performance which reduces the ability to handle the existing workload.

   Therefore, KNKT recommends the AAA review the procedure for the FI flight schedule to consider the workload.

   Responding to the safety recommendation, the aircraft operator issued Standard Operational Procedure (SOP) for flight schedule roster. In the procedure, there are stages that must be followed by the schedule roster in arranging flight and simulator schedules. The procedure also regulates the rest time that must be had by both the FI and pilot students, which is 15 hours each day. FI or pilot students who are fasting will not be given flight schedules. FI with multi-rating will not be given flight schedules if they operated a different aircraft the day before. The SOP ensures that the workload of both the FI and the pilot students remains within acceptable limits.

4. On 7 October 2024, KNKT issued safety recommendation to the aircraft operator as follows:

   04.O-2023-15.02

   The FI conducted multi-engine training flights with some exercises that were performed by reducing power lever(s) to idle position which would trigger the activation of landing gear warning. During the one engine inoperative exercise the landing gear warning was active. After landing, the FI recalled that the landing checklist had not been executed. Several exercises with activation of the landing gear warning might create alarm fatigue.

   Therefore, KNKT recommends the AAA ensure the checklist executes in all phases of flight.

   Responding to the safety recommendation, the aircraft operator issued SOP for Beechcraft Baron G58. The SOP address the procedure for reading the checklist when the aircraft is not in motion and when the aircraft is in the air. If the aircraft is not in motion, the checklist reading procedure uses the read and do checklist procedure. If the aircraft is in the air, the procedure used is the flow and verify checklist. The SOP also regulates the creation of a checklist (take-off, after take-off, descent & approach, landing) in the form of a quick reference card that is mounted to the control column.

5 SAFETY RECOMMENDATIONS

The KNKT acknowledges the safety actions taken by Angkasa Aviation Academy (AAA) and considered that the safety action were relevant to improve safety, however there still safety issues remain to be considered. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report.

The safety recommendation in this investigation report is made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident.

5.1 Angkasa Aviation Academy (AAA)

04.O-2023-15.03

Based on Baron G58 Pilot Operating's Handbook (POH), the aircraft landing gear system had warning horn and [gear up] annunciation to alert the pilots if the landing gear was on wheels-up condition. Those warning and alert active when either throttle is retarded and the Manifold Absolute Pressure (MAP) is below 13 in Hg or if the flaps are fully extended. The Baron G58 POH also described that during one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit. Therefore, during the simulated one-engine inoperative exercise, the horn cannot be silenced as advancing the throttle to above 13 in HG will not represent the simulated one-engine inoperative. During the occurrence flight, the multiple activation of the landing gear up warning horn and [gear up] annunciation which did not pose an actual threat during simulated one-engine inoperative exercise had made the FI and second student pilot desensitized.

The landing gear warning which considered as defense of the unintentional error would not be effective if the pilot became desensitize. The investigation did not find any procedure to verify the actual threat of the landing gear warning during the flight exercise. The absence of that procedure might increase the possibility of pilot becoming desensitize and overlook the actual hazardous of the gear up condition during the landing approach.

Therefore, KNKT recommends the Angkasa Aviation Academy (AAA) to ensure that potential the landing gear warning horn and [gear up] annunciation to be verified to gain the pilot awareness of the actual hazardous of the of the gear up condition during the landing approach.

6 APPENDICES

6.1 The FI Flight Log & Rest Periods Calculation

Year : 2023
Month : September

Date	Aircraft Type	Flying Hour	Operation	Remark
1	C172	02.44	Training	Friday
2-4	Off-Duty			
5	C172	01.20	Training	Tuesday
5	SIMULATOR	06.00	Training	Tuesday
6	C172	03.51	Training	Wednesday
6	SIMULATOR	02.00	Training	Wednesday
7	C172	01.10	Training	Thursday
7	BE58	02.00	Training	Thursday
8	BE58	02.00	Training	Friday
8	C172	01.09	Training	Friday
9-10	Off-Duty			
11	BE58	02.15	Training	Monday
11	C172	02.20	Training	Monday
12	BE58	04.15	Training	Tuesday
13	C172	01.40	Training	Wednesday
14	C172	03.00	Training	Thursday
15-17	Off-Duty			
18	C172	01.30	Training	Monday
19	C172	02.57	Training	Tuesday
20	C172	02.00	Training	Wednesday
21	C172	02.00	Training	Thursday
22	Off-Duty			
23	SIMULATOR	02.00	Training	Saturday
24	B 737 NG	02.10	Commercial	Sunday
25	B 737 NG	04.45	Commercial	Monday
26-29	Off-Duty			
30	B 737 NG	04.20	Commercial	Saturday

Year : 2023
Month : Oktober

Date	Aircraft Type	Flying Hour	START OF FDT	END OF FDT (UTC)	REST PERIODS (HOURS)	Operation	Remark
1	B 737 NG	05.00				Commercial	Sunday
2	BE58	04.00	07.00	17.30		Training	Monday
3	BE58	04.00	07.00	17.30	13.30	Training	Tuesday
4	BE58	04.07	07.00	17.30	13.30	Training	Wednesday
5	BE58	05.00	07.00	17.30	13.30	Training	Thursday

KOMITE NASIONAL KESELAMATAN TRANSPORTASI REPUBLIK INDONESIA
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