



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.23.08.14.04

Aircraft Accident Investigation Report

PT. Garuda Indonesia

B737-800; PK-GNM

Syamsudin Noor International Airport

Republic of Indonesia

7 August 2023

2023

This Preliminary Report is published by the *Komite Nasional Keselamatan Transportasi* (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Law (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

The preliminary report consists of factual information collected until the preliminary report is published. This report will not include analysis and conclusion.

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Jakarta, 31 October 2023
**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHOJONO

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ABBREVIATIONS AND DEFINITIONS

AMC	:	Airport Movement Control
AOC	:	Air Operator Certificate
ARFF	:	Airport Rescue and Fire Fighter
ATPL	:	Airline Transport Pilot License
ATS	:	Air Traffic Services
CPL	:	Commercial Pilot License
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CVR	:	Cockpit Voice Recorder
EGPWS	:	Enhanced Ground Proximity Warning System
FDR	:	Flight Data Recorder
FMC	:	Flight Management Computer
ft	:	Feet
ILS	:	Instrument Landing System
KNKT	:	Komite Nasional Keselamatan Transportasi
mb	:	Milibars
MSN	:	Manufacturer's Serial Number
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
QNH	:	Atmospheric Pressure at Nautical height
SIC	:	Second in Command
USA	:	United States of America
UTC	:	Universal Time Coordinate

SYNOPSIS

On 7 August 2023, a Boeing 737-800 aircraft, registered PK-GNM was being operated by PT. Garuda Indonesia on a schedule passenger flight from Soekarno-Hatta International airport (CGK/WIII), Jakarta, Indonesia to Syamsudin Noor International airport (BDJ/WAOO), Banjarmasin, South Kalimantan, with flight number GIA532. Onboard the aircraft were two pilots, five flight attendants, and 145 passengers. The Pilot in Command (PIC) acted as Pilot Monitoring (PM), and the Second in Command (SIC) acted as Pilot Flying (PF). The flight was uneventful until the aircraft approach Banjarmasin.

The flight was approach followed the Instrument Landing System (ILS) procedure Runway 10 and the wind was reported at speed between 9 to 15 kts with direction 130 Degrees.

While passing the runway threshold, the pilots noticed that the Enhanced Ground Proximity Warning System (EGPWS) altitude callout sound faster than normal, then the PIC assisted by holding the control column using left hand while the right hand standby at the lower throttle lever during the flare-out.

The aircraft was touched down and bounced with high pitch and the runway is off-sight then PIC callout “go around” continued with adding the engine power by push forward the throttle lever. The SIC continued adding the power by managed the throttle levers. During the go around, the aircraft experiencing tail strike. The Tower controller saw spark while the aircraft bouncing and contacted the Apron Movement Control to perform runway inspection. The go around continued and the pilot was instructed by the controller for holding on way point LIBNU.

After the runway inspection completed, the aircraft landed safely.

After parking, the pilot advised the engineer to perform a walkaround check and found the lower surface on the aft fuselage skin and tailskid damper were scratched and damaged, respectively.

Following this occurrence Garuda Indonesia has performed several safety actions and the investigation considered that the safety actions were relevant to address the safety issues.

KNKT is not issuing safety recommendation in this Preliminary Report. The investigation is continuing, should any further relevant safety issues emerge during investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 7 August 2023, a Boeing 737-800 aircraft, registered PK-GNM was being operated by PT. Garuda Indonesia on a schedule passenger flight from Soekarno-Hatta International airport (CGK/WIII), Jakarta¹ to Syamsudin Noor International Airport (BDJ/WAOO), Banjarmasin, South Kalimantan², with flight number GIA532.

The flight was the second flight for both pilots on that day. The first flight of both pilots was from Sam Ratulangi International Airport (MDC/WAMM), Manado, North Sulawesi to Jakarta with different aircraft registration.

At 0519 UTC, in the daylight condition, the aircraft departed Jakarta and cruised at an altitude of 36,000 feet. Onboard the aircraft were two pilots, five flight attendants, and 145 passengers. The Pilot in Command (PIC) acted as Pilot Monitoring (PM), and the Second in Command (SIC) acted as Pilot Flying (PF). The flight was uneventful until the aircraft commenced approach for landing in Banjarmasin.

At 0617 UTC, the aircraft was approaching waypoint DUNIA, the Approach controller instructed to descend to altitude of 4,000 feet.

At 0631 UTC, the Approach controller issued clearance for approach by following Instrument Landing System (ILS) Runway 10, to continue descend to 3,000 ft and to report when the aircraft position was at waypoint LIBNU. The instructions were acknowledged by the pilot.

At 0635 UTC, the aircraft was leaving waypoint LIBNU, then the pilot contacted to the Tower controller. The Tower controller issued landing clearance and informed that the wind velocity was between 9 to 15 knots with direction 130° and QNH³ was 1,009 mbs.

At 0638 UTC, the pilots completed the landing checklist.

At 0640 UTC, on final approach when the aircraft altitude was about 700 ft, the autopilot disengaged, and pilot started manual flying. While passing the runway threshold, the pilots noticed that the Enhanced Ground Proximity Warning System (EGPWS) altitude callout intervals were quicker than normal. The PIC then assisted the SIC by holding the control column using left hand while the right hand placed at the aft of the throttle levers until flare-out.

At 0641 UTC, the aircraft touched down and bounced with high pitch attitude and the runway was off-sight of the pilots. The PIC commanded for go around and adding the engines power by push forward the throttle levers. The SIC continued added the engines power by managed the throttle lever.

During the go around, the aircraft experiencing second touched down with a higher pitch attitude and the lower part of the empennage impacted to the runway (tail

¹ Soekarno-Hatta International airport (CGK/WIII), Jakarta will be named as Jakarta for the purpose of this report.

² Syamsudin Noor International Aairport (BDJ/WAOO), Banjarmasin, South Kalimantan will be named as Banjarmasin for the purpose of this report.

³ QNH is an Atmospheric Pressure at Nautical height

strike). The Tower controller saw sparks during the aircraft contacted the runway then called Airport Rescue and Fire Fighter (ARFF) personnel for standby and requested Airport Movement Control (AMC) to perform runway inspection.

The aircraft continued the go around then the landing gear were retracted and the flap set to fifteen. The Tower controller instructed the pilot to continue climb to altitude of 5,000 ft, proceed to waypoint LIBNU and to contact Approach controller. The pilot programmed the Flight Management Computer (FMC) to create holding pattern on waypoint LIBNU and waited for the runway inspection completed.

While holding, the pilots performed after take-off checklist, and checked the aircraft systems. The pilot did not find any aircraft system abnormality. The pilot contacted the flight attendant and asked the cabin condition whether any damage or injury of the passengers. The flight attendant reported that no personnel injury and one oxygen mask in the lavatory dropped.

After aircraft and cabin condition checking, the PIC contacted ground operation personnel reporting the go around event and ask whether any finding on the runway inspection. The ground operation personnel acknowledged and informed that the runway inspections were still on going and no finding yet.

About 0653 UTC, the PIC took over the control and acted as PF and the SIC acted as PM.

About 0703 UTC, the PIC contacted the Approach controller and received a clearance for landing approach. The aircraft then left waypoint LIBNU. The aircraft approached Runway 10 by following the ILS procedure.

About 0706 UTC, pilots performed landing checklist when the Tower controller informed the weather condition of the surface wind direction was variable form 90° – 130° with velocity between 6 up to 15 knots, QNH was 1,008 mbs and issued landing clearance.

At 0709 UTC, the aircraft touched down safely and taxied to the apron.

After the aircraft stopped at the parking stand, the pilot advised the engineer of the go around and requested to perform walkaround check. During the walk around check it was found that the lower aft fuselage skin and tailskid damper were scratched and damaged.

1.2 Injuries to Persons

There were no injuries to persons as a result of this occurrence.

1.3 Damage to Aircraft

The aircraft was substantially damage.

The damage was found on the lower surface of the aft fuselage and the tailskid damper on the section 46 to 48, from station 827 to 1088. The damages were scratches, cracks, and punctures on lower surface of the aft fuselage skin. The widest scratch marks dimension found on the lower aft fuselage skin was 78 cm. The tailskid damper was detached. The details of the damage are shown in Figure 1.

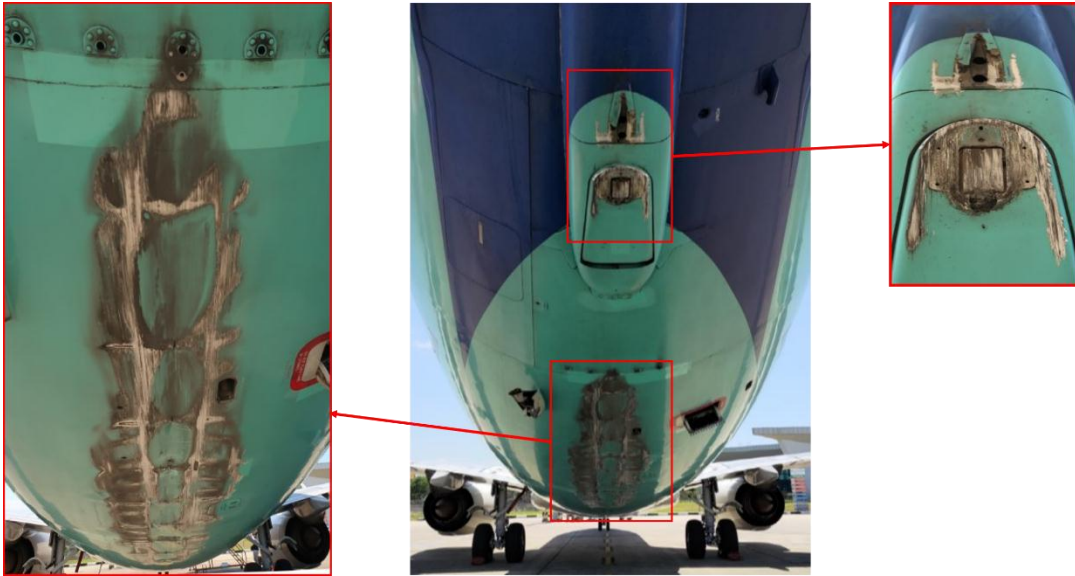


Figure 1. External damage on lower surface of the aft fuselage

The damages were also found on the aft fuselage structure which consisted of crack and deformation on the frame, stringer, and clip. The details of the damage are shown in figure 2.



Figure 2. Internal damage on lower surface of the aft fuselage

1.4 Other Damage

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

1.5 Personnel Information

1.5.1 Pilot in Command

Gender : Male
Age : 41 years
Nationality : Indonesia
Date of joining company : 8 February 2010
License : ATPL
 Date of issue : 16 November 2016
 Aircraft type rating : B737
Instrument rating validity : 31 January 2024
Medical certificate : First Class
 Last of medical : 3 May 2023 First Class
 Validity : 3 November 2023
 Medical limitation : Holder shall wear corrective lenses for near and distant vision
Last line check : 4 March 2023
Last proficiency check : 18 July 2023

Flying experience

Total hours : 4,897 hours 53 minutes
Total on type : 2,179 hours 7 minutes
Last 90 days : 117 hours 42 minutes
Last 30 days : 40 hours 30 minutes
Last 7 days : 11 hours 3 minutes
Last 24 hours : 9 hours 7 minutes
This flight : 2 hours 19 minutes

1.5.2 Second in Command

Gender : Male
Age : 34 years
Nationality : Indonesia
Date of joining company : 19 September 2016
License : CPL
 Date of issue : 20 January 2015
 Aircraft type rating : B737

Instrument rating validity : 30 April 2024
Medical certificate : First Class
 Last of medical : 5 May 2023
 Validity : 5 November 2023
 Medical limitation : Holder shall wear corrective lenses
Last line check : -
Last proficiency check : 21 April 2023

Flying experience

Total hours : 3,317 hours 6 minutes
Total on type : 3,317 hours 6 minutes
Last 90 days : 64 hours 51 minutes
Last 30 days : 54 hours 3 minutes
Last 7 days : 9 hours 7 minutes
Last 24 hours : 9 hours 7 minutes
This flight : 2 hours 19 minutes

1.6 Aircraft Information

1.6.1 General

Registration Mark : PK-GNM
Manufacturer : Boeing
Country of Manufacturer : United States of America
Type/Model : 737-800
Serial Number : 41322
 Year of Manufacture : 2014

Certificate of Airworthiness

Date of issue : 5 October 2022
Validity : 4 October 2023
Category : Transport
Limitation : None

Certificate of Registration

Number : 3527
Date of issue : 8 September 2022
Validity : 7 September 2025

Time Since New : 22,160 hours
Cycles Since New : 14,408 cycles
Last Major Check : C-Check, accomplished on 30 September 2022
Last Minor Check : A-Check, accomplished on 6 June 2023

1.6.2 Engines

Manufacturer : CFM International
Type/Model : CFM56-7B26
Serial Number-1 engine : 660235
 Time Since New : 21,429 hours
 Cycle Since New : 14,101 cycles
Serial Number-2 engine : 660276
 Time Since New : 19,495 hours
 Cycle Since New : 13,005 cycles

1.7 Meteorological Information

Weather report for Banjarmasin, issued on 14 August 2022, indicated that, in the time of occurrence, the weather was cloudy with visibility of 10 km and the wind velocity was between 9 – 15 knots and the wind direction varied between 90° to 130°.

1.8 Aids to Navigation

Ground-based navigation aids/onboard navigation aids/aerodrome visual ground aids and their serviceability were not a factor in this occurrence.

1.9 Communications

All communications between ATS and the crew were recorded by ground based automatic voice recording equipment and Cockpit Voice Recorder (CVR) for the duration of the flight. The quality of the aircraft's recorded transmissions was good. The details of the communication will be included in the final report.

1.10 Aerodrome Information

Airport Name : Syamsudin Noor International Airport
Airport Identification : WAOO/BDJ
Airport Operator : PT. Angkasa Pura I (Persero)
Airport Certificate : 026/SBU – DBU/IV/2021
 Validity : 30 July 2025
Coordinate : 03°26'23.39" S 114°45'10.17" E
Elevation : 66 feet

Runway Direction : 10/28
Runway Length : 2,500 meters
Runway Width : 45 meters
Surface : Asphalt

1.11 Flight Recorders

The aircraft was fitted with Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR). The FDR was manufactured by Honeywell with part number 980-4750-009 and serial number 01031. The CVR was manufactured by Honeywell with part number 980-6022-001 and serial number CVR120-16185.

Both recorders were transported to the KNKT facility for data processing. Detail of the flight recorders data will be included in the final report

1.12 Wreckage and Impact Information

Scratch mark was found on the runway, approximately 400 meters from the beginning Runway 10 and about 3.5 meters on the right of runway centerline. The length of the scratch mark was approximately 18 meters and widest part was about 80 centimeters.

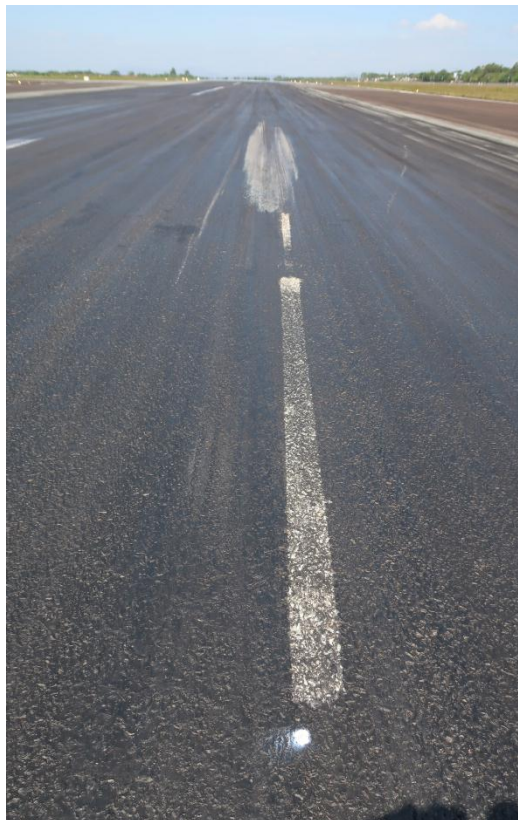


Figure 3. Scratch marks on the runway

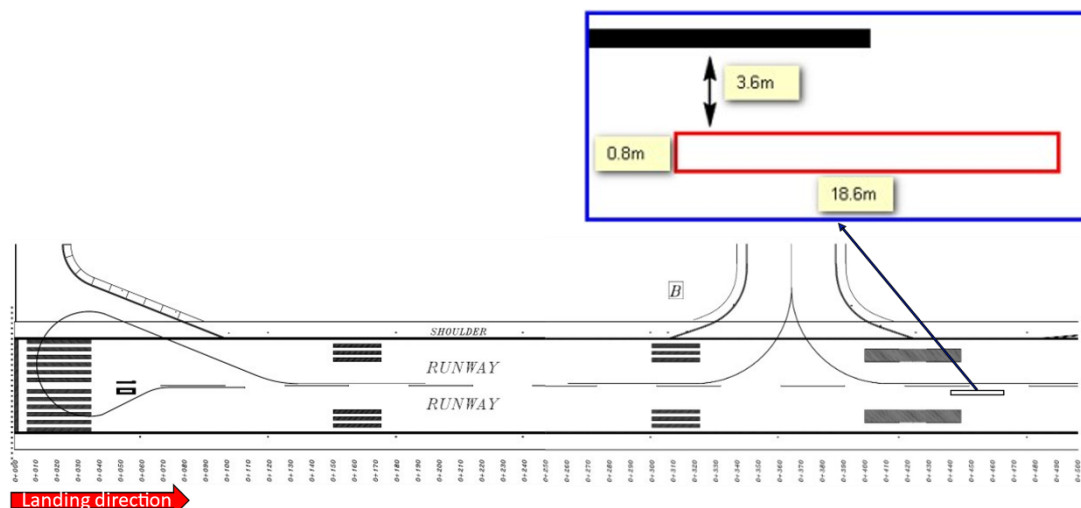


Figure 4. Location of the marks found on the runway

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted to this occurrence, nor were they required.

1.14 Fire

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

1.15 Survival Aspect

Not relevant to this occurrence.

1.16 Tests and Research

Should any tests or researches be carried out due to the occurrence, the result will be included in the final report.

1.17 Organizational and Management Information

The aircraft was being operated by PT. Garuda Indonesia which held valid operator certificate with AOC number of 121-001.

The procedures and policies relevant to the occurrence will be discussed in the final report.

1.18 Additional Information

On 30 March 2023, a Boeing 737-800 aircraft, PK-GMC operated by Garuda Indonesia with flight number GIA 867 flight from Bangkok to Jakarta has experienced tail strike during landing at Jakarta. The preliminary investigation was reported on KNKT report number KNKT.23.03.04.04.

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

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.

2 FINDINGS

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.

The KNKT identified findings as follows:

1. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
2. Both pilots held valid licenses and medical certificates.
3. The Air Traffic Controllers held valid license and medical certificates.
4. During the flight from Jakarta until first landing, the Pilot in Command (PIC) acted as Pilot Monitoring (PM) and the Second in Command (SIC) acted as Pilot Flying (PF). The aircraft control changed after the go around.
5. While passing the runway threshold, both pilots noticed that the Enhanced Ground Proximity Warning System (EGPWS) altitude callout interval was faster than normal.
6. The aircraft touched down and bounced with high pitch. During bouncing, the runway was off-sight of the pilots and the PIC commanded for go around.
7. During the go around, the aircraft experiencing second touchdown with a higher pitch and the lower part of the empennage impacted to the runway.
8. The Tower controller saw sparks during the aircraft contacted the runway then called Airport Rescue and Fire Fighter (ARFF) personnel for standby and requested Airport Movement Control (AMC) to perform runway inspection.
9. The pilots checked the aircraft systems, and did not find any aircraft system abnormality. The flight attendant reported no personnel injury and one oxygen mask in the lavatory dropped.
10. The flight returned and safely landing using Runway 10.
11. The aircraft was substantially damage with some scratches, deformations, cracks, punctures, and holes on lower surface of the aft fuselage skin and its structures.

3 SAFETY ACTION

At the time of issuing this report, the KNKT had been informed by the operator that the operator performed any safety actions resulting from this occurrence. The informed safety actions are as follow:

1. The Chief Pilot of B737 conducted briefing to both pilots on 10 August 2023, the topic includes:
 - a. Review notice 006/23 tail strike, the notice contains information about several factors that may cause tail strike landing including suggestions for prevention.
 - b. Emphasize flare, touchdown and balked landing technique comprehensively.
 - c. Remind both pilots to monitor and assess of the aircraft energy states and its anticipated flight path based on OM-D.
 - d. Demonstrates resiliencies when encountering an unexpected event, then applies appropriate and timely decision-making technique based on FCTM.
2. On 14 August 2023, Chief Pilot of B737 published Notice to Flight Crew B737 No. 011/2023 “Tail Strike landing” for all B737 pilots. The notice contains information and reminder of several factors that may cause tail strike landing including suggestions for prevention.
3. Garuda Indonesia held sharing session and safety meeting with subject “Tail strike on landing” to whole flight crew B737-800 on 15 August 2023. This event attended by 243 pilots via online and 15 pilots via offline.
4. Flight Safety Bulletin issue 31 was published on 25 August 2023 which includes an article about tail strike causes and prevention (*Tail strike: Penyebab & Pencegahan*). This bulletin was published for whole Garuda Indonesia employees to improve safety awareness.
5. On 5 September 2023, Garuda and Boeing held workshop about “Hard Landing”. This event attended by Flight Operations, Safety, Quality Standard, Airworthiness Management, Maintenance Management division and Garuda Maintenance Facility (GMF) personnels.
6. Garuda Indonesia planned to update the syllabus of type recurrent or proficiency check to emphasize exercise of hard landing prevention on 2nd semester of 2023. The update syllabus will cover scenario of stall in landing configuration, hard landing prevention and cross wind landing.

4 SAFETY RECOMMENDATIONS

At the time of publishing this Preliminary Report, KNKT was not issuing any safety recommendation. Should any further relevant safety issues emerge during the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and will publish it as required.

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