



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.21.12.19.04

Aircraft Serious Incident Investigation Report

PT Jayawijaya Dirgantara

Boeing 737-200; PK-JRW

Sentani Airport, Papua

Republic of Indonesia

18 December 2021

2022

This Preliminary Report was 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 initial investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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

Readers are advised that the KNKT investigates for the sole purpose of enhancing aviation safety. Consequently, the KNKT reports are confined to matters of safety significance and may be misleading if used for any other purpose.

As the KNKT believes that safety information is of greatest value if it is passed on for the use of others, readers are encouraged to copy or reprint for further distribution, acknowledging the KNKT as the source.

When the KNKT makes recommendations as a result of its investigations or research, safety is its primary consideration.

However, the KNKT fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

Readers should note that the information in KNKT reports and recommendations is provided to promote aviation safety. In no case is it intended to imply blame or liability.

Jakarta, 4 March 2022
**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

TABLE OF CONTENTS

| | |
|---|------------|
| TABLE OF CONTENTS | i |
| TABLE OF FIGURES | ii |
| ABBREVIATIONS AND DEFINITIONS | iii |
| SYNOPSIS | iv |
| 1 FACTUAL INFORMATION | 1 |
| 1.1 History of the Flight..... | 1 |
| 1.2 Injuries to Persons..... | 2 |
| 1.3 Damage to Aircraft | 2 |
| 1.4 Other Damage..... | 2 |
| 1.5 Personnel Information | 3 |
| 1.5.1 Pilot in Command..... | 3 |
| 1.5.2 Second in Command | 3 |
| 1.6 Aircraft Information..... | 4 |
| 1.6.1 General | 4 |
| 1.6.2 Engines | 5 |
| 1.7 Meteorological Information..... | 5 |
| 1.8 Aids to Navigation..... | 5 |
| 1.9 Communications | 6 |
| 1.10 Aerodrome Information | 6 |
| 1.11 Flight Recorders..... | 6 |
| 1.12 Wreckage and Impact Information | 7 |
| 1.13 Fire..... | 7 |
| 1.14 Survival Aspects | 7 |
| 1.15 Tests and Research | 7 |
| 1.16 Organizational and Management Information | 7 |
| 1.17 Additional Information | 8 |
| 1.18 Useful or Effective Investigation Techniques | 8 |
| 2 FINDINGS | 9 |
| 3 SAFETY ACTION | 10 |
| 4 SAFETY RECOMMENDATIONS | 11 |
| 5 APPENDICES | 12 |

TABLE OF FIGURES

| | |
|---|---|
| Figure 1: The right engine front view. | 2 |
| Figure 2: The estimated debris location of the right engine of PK-JRW | 7 |

ABBREVIATIONS AND DEFINITIONS

| | | |
|------|---|--|
| AOC | : | Air Operator Certificate |
| ATPL | : | Airline Transport Pilot License |
| ATC | : | Air Traffic Control |
| ATCo | : | Air Traffic Control Officer |
| ATS | : | Air Traffic Control Services |
| BMKG | : | <i>Badan Meteorologi, Klimatologi dan Geofisika</i> (the Agency of Meteorology, Climatology and Geophysics of Indonesia) |
| CCTV | : | Closed Circuit Television |
| CPL | : | Commercial Pilot License |
| CVR | : | Cockpit Voice Recorder |
| EGT | : | Engine Gas Temperature |
| FDR | : | Flight Data Recorder |
| FOO | : | Flight Operation Officer |
| HP | : | High Pressure |
| hPa | : | hectopascal |
| km | : | kilometers |
| KNKT | : | The <i>Komite Nasional Keselamatan Transportasi</i> |
| LT | : | Local Time |
| LP | : | Low Pressure |
| NNC | : | Non-Normal Checklist |
| PIC | : | Pilot in Command |
| PF | : | Pilot Flying |
| PM | : | Pilot Monitoring |
| SIC | : | Second in Command |
| UTC | : | Universal Time Coordinated |
| °C | : | Degrees Centigrade (Celsius) |

SYNOPSIS

A Boeing 737-200 aircraft, registration PK-JRW, was being operated by PT Jayawijaya Dirgantara on a non-schedule cargo flight from Sentani International Airport, Jayapura, Papua (WAJJ) to Wamena Airport, Papua, Indonesia (WAVV). Onboard in this flight was two pilots, one Flight Operation Officer (FOO), one engineer and 12,556 kg of cargo. According to the weight and balance report, the aircraft was operated within the weight and balance envelope.

On 17 December 2021 at 2320 UTC (18 December 2021 at 0820 LT) the aircraft block off. The Pilot in Command (PIC) acted as Pilot Flying (PF) and the Second in Command (SIC) acted as Pilot Monitoring (PM).

At 0831 LT, after the aircraft line up on the runway 30 of Sentani, the aircraft initiated the takeoff roll. When aircraft reached the rotation speed for take off, a loud bang was heard and the aircraft experienced heavy vibration.

The PM reported to the Sentani Air Traffic Control Officer (ATCo) about the problem and indicated the emergency situation. The ATCo acknowledged the situation and provided the relevant guidance to the pilots for returning.

The PM requested to climb to altitude of 4,500 feet for holding and conducted the Non-Normal Checklist (NNC) of Engine Sever Damage, afterward the pilots preparing to return to Sentani.

At 0903 LT, the aircraft safely landed in Sentani. After the aircraft parked on the parking bay, the engineer checked the right engine and found that the engine was severely damaged.

The investigation is ongoing. The KNKT did not receive any safety action from the operator and in this preliminary investigation report KNKT issued safety recommendation.

1 FACTUAL INFORMATION

1.1 History of the Flight

A Boeing 737-200 aircraft, registration PK-JRW, was being operated by PT Jayawijaya Dirgantara¹ on a non-schedule cargo flight from Sentani International Airport, Jayapura, Papua (WAJJ)² to Wamena Airport, Papua, Indonesia (WAVV). Onboard in this flight was two pilots, one Flight Operation Officer (FOO), one engineer and 12,556 kg of cargo. According to the weight and balance report, the aircraft was operated within the weight and balance envelope.

On 17 December 2021 at 2320 UTC³ (18 December 2021 at 0820 LT), the aircraft block off. The Pilot in Command (PIC) acted as Pilot Flying (PF) and the Second in Command (SIC) acted as Pilot Monitoring (PM).

At 0831 LT, after the aircraft line up on the runway 30 of Sentani, the aircraft initiated the takeoff roll. When aircraft reached the rotation speed for takeoff, a loud bang was heard and the aircraft experienced heavy vibration. The PM observed the engine instruments and noticed that the right engine indications equal to idle power condition. The right engine Low Pressure (LP) Compressor speed (N1) indicated 30%, the High Pressure (HP) Compressor speed (N2) indicated 22% and Engine Gas Temperature (EGT) indication fluctuated.

The PM reported to the Sentani Air Traffic Control Officer (ATCo) about the problem and indicated the emergency situation. The ATCo acknowledged the situation and provided the relevant guidance to the pilots for returning.

The PM requested to climb to altitude of 4,500 feet for holding and to conduct the Non-Normal Checklist (NNC) of Engine Sever Damage, afterward the pilots preparing to return to Sentani.

At 0903 LT, the aircraft safely landed in Sentani. After the aircraft parked on the parking bay, the engineer checked the right engine and found that the engine was severely damaged.

¹ PT. Jayawijaya Dirgantara will be named as Jayawijaya for the purpose of this report.

² The Sentani International Airport of Jayapura, Papua, Indonesia will be named as Sentani for the purpose of this report.

³ The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. The Local Time is UTC + 9 hours.



Figure 1: The right engine front view.

1.2 Injuries to Persons

No one injured in this occurrence.

1.3 Damage to Aircraft

In general, no damage to the aircraft other than the right engine which was severely damage.

After the occurrence, the borescope inspection to the right engine was conducted. The result is as follow:

1. All blades of the engine compressor stage 1 until stage 5 were severely damage.
2. The blades of the compressor stage 6 were dent and bent.
3. The blades of the compressor stage 7 until stage 13 were bent, dent and (or) tear.
4. The combustion chamber and the High Pressure (HP) and Low Pressure (LP) turbine were no damages.

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 : 45 years
Nationality : Indonesia
Marital status : Married
Date of joining company : 25 August 2020
License : ATPL
 Date of issue : 17-02-2010
 Aircraft type rating : B737-100/200
Instrument rating validity : 30 April 2022
Medical certificate : First Class
 Last of medical : 26 January 2021
 Validity : 26 January 2022
 Medical limitation : Holder shall wear corrective lens
Last line check : 07 June 2021
Last proficiency check : 11 November 2021

Flying experience

Total hours : 13481:10 hours
Total on type : 1402:30 hours
Last 90 days : 115:55 hours
Last 30 days : 46:40 hours
Last 7 days : 12:45 hours
Last 24 hours : 1:14 hours
This flight : 1:14 hours

1.5.2 Second in Command

Gender : Male
Age : 33 years
Nationality : Indonesia
Marital status : Single
Date of joining company : 28 January 2013
License : CPL
 Date of issue : 11 September 2019
 Aircraft type rating : B737-100/200

| | |
|----------------------------|--------------------|
| Instrument rating validity | : 28 February 2022 |
| Medical certificate | : First Class |
| Last of medical | : 06 October 2021 |
| Validity | : 06 April 2022 |
| Medical limitation | : None |
| Last line check | : 19 December 2019 |
| Last proficiency check | : 10 March 2021 |
| Flying experience | |
| Total hours | : 2039:18 hours |
| Total on type | : 2039:18 hours |
| Last 90 days | : 76:27 hours |
| Last 30 days | : 12:45 hours |
| Last 7 days | : 12:45 hours |
| Last 24 hours | : 1:14 hours |
| This flight | : 1:14 hours |

1.6 Aircraft Information

1.6.1 General

| | |
|------------------------------|----------------------------|
| Registration Mark | : PK-JRW |
| Manufacturer | : Boeing Company |
| Country of Manufacturer | : United States of America |
| Type/Model | : Boeing 737-210C |
| Serial Number | : 21822 |
| Year of Manufacture | : 1979 |
| Certificate of Airworthiness | |
| Issued | : 10 October 2021 |
| Validity | : 9 October 2021 |
| Category | : Transport |
| Limitations | : None |
| Certificate of Registration | |
| Number | : 3411 |
| Issued | : 31 March 2019 |
| Validity | : 30 March 2022 |
| Time Since New | : 80,167 Hours |

Cycles Since New : 71,399 Cycles
Last Major Check : C Check on 29 May 2019
Last Minor Check : Daily Inspection on 17 December 2021

1.6.2 Engines

Manufacturer : Pratt & Whitney Canada
Type/Model : JT8D-17
Serial Number-1 engine : P688841D
▪ Time Since New : 71,341 hours
▪ Cycles Since New : 40,987 cycles
Serial Number-2 engine : P686344
▪ Time Since New : 50,266 hours
▪ Cycles Since New : 40,318 cycles

The last shop visit of the right engine was on 13 June 2016 (47,230 total engine hours and 37,418 total engine cycle). The shop visit was conducted at Atlantic Gas Turbine Center at Miami USA. Since the last shop visit of the right engine, the remaining cycle of HP Compressor stage 8 on the date of the occurrence was 1,226 cycles. The next shop visit was scheduled on April 2022 as the HP Compressor stage 8 is the limit life of the engine.

The operator had not implemented the engine monitoring program as the program has not been mandated by the regulation.

1.7 Meteorological Information

Weather Report for Sentani as reported by the *Badan Meterologi, Klimatologi, dan Geofisika* (BMKG – the agency of meteorology, climatology and geophysics of Indonesia) on 17 December 2021 at 0000 UTC (18 December 2021 at 0900 LT) as follows:

Wind : 120 / 03 knots
Weather : The visibility was 10 km with fog at altitude about 1,200 feet.
Temperature : 28°C
Dewpoint : 23°C
Humidity : 49%
Pressure : 1009 hPa

1.8 Aids to Navigation

The information of the aid to navigation will be included in the final report.

1.9 Communications

All communications between Air Traffic Control Services (ATS) and the pilots were recorded by ground based automatic voice recording equipment and the Cockpit Voice Recorder for the duration of the flight.

The relevant information regarding quality of the communication system will be included in the Final Report.

1.10 Aerodrome Information

| | |
|------------------------|---|
| Airport Name | : Sentani International Airport |
| Airport Identification | : WAJJ |
| Airport Operator | : PT Angkasa Pura I Cabang Sentani Jayapura |
| Airport Certificate | : 068/SBU-DBU/II/2020 |
| Validity | : 10 February 2025 |
| Coordinate | : 02° 34' 18.54" S; 140° 30' 42.26" E |
| Elevation | : 88 meters |
| Runway Direction | : 12/30 |
| Runway Length | : 3,000 meters |
| Runway Width | : 45 meters |
| Surface | : Asphalt |

1.11 Flight Recorders

Flight Data Recorder

| | |
|---------------|--------------------|
| Manufacturer | : L3 Communication |
| Type/Model | : FA2100 |
| Part Number | : 2100-4043-00 |
| Serial Number | : 000445032 |

Cockpit Voice Recorder

| | |
|---------------|---------------------|
| Manufacturer | : L3 Communications |
| Type/Model | : FA2100 |
| Part Number | : 2100-1020-00 |
| Serial Number | : 000320801 |

The FDR and CVR have been transported to KNKT recorder facility for data download and analysis process. The FDR and CVR data have been successfully downloaded. The detail information regarding the FDR and CVR will be included in the Final Report.

1.12 Wreckage and Impact Information

The debris of the fan blades of the right engine was found on the runway about 2,100 meters to 2,300 meters from the beginning runway 30.

The debris were also found on the residential place about 500 meters and 1,900 meters from the beginning of runway 12.

The estimated location of the debris is shown in the figure below.

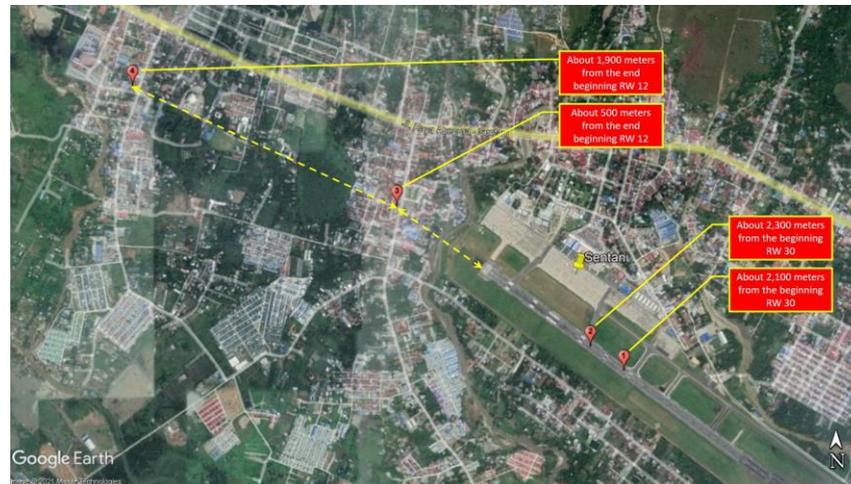


Figure 2: The estimated debris location of the right engine of PK-JRW

1.13 Fire

The video footage of the airport Closed Circuit Television (CCTV) showed that during the aircraft rotation for takeoff, a fire blast appeared from the right engine exhaust.

There was no evidence of inflight fire.

1.14 Survival Aspects

Not relevant to this investigation.

1.15 Tests and Research

Should any test and research during the investigation will be included in the Final Report.

1.16 Organizational and Management Information

| | |
|----------------------|--|
| Aircraft Owner | : PT Jayawijaya Dirgantara, Indonesia |
| Aircraft Operator | : PT Jayawijaya Dirgantara, Indonesia |
| Address | : Perkantoran Citra Garden City Aeroworld 8 Blok B05/01 Pegadunga, Kalideres – Jakarta 11830, Indonesia. |
| Operator Certificate | : AOC 121-044 valid until 29 April 2022 |

The operator operates three Boeing 737-200 aircraft including the accident aircraft.

1.17 Additional Information

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 course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.18 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.

According to factual information during the investigation, the KNKT identified initial findings as follows:

1. The aircraft had a valid Certificate of Airworthiness and Certificate of Registration.
2. The pilots held valid licenses.
3. The aircraft operated within the aircraft weight and balance envelope.
4. The weather was reported clear in Sentani.
5. When aircraft reached the rotation speed, a loud bang was heard and the aircraft experienced heavy vibration. The investigation received video footage from the CCTV showed that during the aircraft rotation a fire blast appeared from the engine exhaust. There was no indication of inflight and post impact fire.
6. The PM reported to the Sentani Air Traffic Control Officer (ATCo) about the problem and indicated the emergency situation of the aircraft. Thereafter, requested to climb to the altitude of 4,500 feet for holding and conducted the Non-Normal Checklist (NNC) of Engine Sever Damage.
7. At 0903 LT, the aircraft safely landed in Sentani. After the aircraft parked on the parking bay, the engineer checked the engine number 2 and found that the engine was severely damaged.
8. The debris of the fan blade of the engine number 2 was found on the runway and on the residential place about 500 meters and 1,900 meters from the beginning of runway 12.
9. The borescope inspection result showed that the blade of the compressor stage 1 until stage 5 was severely damages. The blades of the compressor stage 6 were bend and dent. The blades of the compressor stage 7 until stage 13 were bend, dent and tear. The combustion chamber and all of the turbines were no damage.
10. The right engine had 1,226 cycles prior to the next shop visit which was scheduled on April 2022.
11. The operator had not implemented the engine monitoring program as the program has not been mandated by the regulation.

3 SAFETY ACTION

At the time of issuing this Preliminary Report, the KNKT had not been informed any safety actions resulting from this occurrence.

4 SAFETY RECOMMENDATIONS

4.1 PT Jayawijaya Dirgantara, Indonesia (aircraft operator)

04.O-2022-19.01

The operator had not implemented the engine monitoring program as the program has not been mandated by the regulation. The engine performance monitoring program may provide an early indication of engine performance degradation. Unmonitored engine performance might lead to unexpected engine problem.

Therefore, KNKT recommend the operator to conduct the engine performance monitoring program.

5 APPENDICES

Not applicable

KOMITE NASIONAL KESELAMATAN TRANSPORTASI REPUBLIK INDONESIA

Jl. Medan Merdeka Timur No.5 Jakarta 10110 INDONESIA

Phone : (021) 351 7606 / 384 7601 Fax : (021) 351 7606 Call Center : 0812 12 655 155

website 1 : <http://knkt.dephub.go.id/webknkt/> website 2 : <http://knkt.dephub.go.id/knkt/>

email : knkt@dephub.go.id