



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI  
REPUBLIC OF INDONESIA**

# PRELIMINARY

**KNKT.17.05.17.04**

**Aircraft Accident Investigation Report**

**PT. Sriwijaya Air**

**Boeing 737-300; PK-CJC**

**Rendani Airport, Manokwari, West Papua**

**Republic of Indonesia**

**31 May 2017**



**2017**

This preliminary investigation report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3<sup>rd</sup> 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.

---

# TABLE OF CONTENTS

---

<b>TABLE OF CONTENTS .....</b>	<b>1</b>
<b>TABLE OF FIGURES .....</b>	<b>3</b>
<b>ABBREVIATIONS AND DEFINITIONS .....</b>	<b>4</b>
<b>SYNOPSIS.....</b>	<b>5</b>
<b>1 FACTUAL INFORMATION .....</b>	<b>6</b>
1.1 History of the Flight.....	6
1.2 Injuries to Person .....	7
1.3 Damage to Aircraft .....	7
1.4 Other Damage .....	8
1.5 Personnel Information .....	8
1.5.1 Pilot in Command.....	8
1.5.2 Second in Command .....	8
1.5.3 Flight Attendant.....	9
1.6 Aircraft Information.....	9
1.7 Meteorological Information.....	9
1.8 Aids to Navigation.....	10
1.9 Communications.....	11
1.10 Aerodrome Information .....	11
1.11 Flight Recorders.....	13
1.11.1 Flight Data Recorder .....	13
1.11.2 Cockpit Voice Recorder .....	14
1.12 Wreckage and Impact Information .....	15
1.13 Medical and Pathological Information .....	16
1.14 Fire.....	16
1.15 Survival Aspect.....	16
1.16 Test and research .....	17
1.17 Organizational and Management Information.....	17
1.17.1 The Aircraft Operator .....	17
1.17.2 Aircraft Operator Manual.....	17
1.17.2.1 Stabilized Approach (Boeing 737-300 FCTM page 5.4).....	17
1.17.3 Airport Operator .....	18
1.17.3.1 Aerodrome Manual .....	19
1.17.3.2 Aerodrome Inspection Procedure .....	21

1.17.4	Air Navigation Provider .....	21
1.17.5	DGCA of Indonesia Regulations.....	22
1.17.5.1	Manual of Standard CASR Part 139 .....	22
1.18	Additional Information .....	25
1.19	Useful or Effective Investigation Techniques .....	25
<b>2</b>	<b>FINDINGS.....</b>	<b>26</b>
<b>3</b>	<b>SAFETY ACTION .....</b>	<b>27</b>
<b>4</b>	<b>SAFETY RECOMMENDATIONS .....</b>	<b>28</b>
4.1	PT. Sriwijaya Air .....	28
4.2	Rendani Airport .....	28
4.3	Director General of Civil Aviation (DGCA) .....	28
<b>5</b>	<b>APPENDICES.....</b>	<b>29</b>

---

## TABLE OF FIGURES

---

Figure 1: Damage on the lower frame bulkhead of the nose landing gear compartment .....	7
Figure 2: Damage on left engine fan blades .....	8
Figure 3: The published RNAV approach chart for runway 35 .....	10
Figure 4: Grass on the runway edge .....	12
Figure 5: Warp area on the runway surface.....	12
Figure 6: Standing water in the warp runway surface .....	13
Figure 7: The water splash of accident aircraft landed & rolled on runway 35 recorded on CCTV .....	13
Figure 8: The significant FDR parameters .....	14
Figure 9: The aircraft position after stop .....	15
Figure 10: White marks of main wheel on runway along the aircraft trajectory.....	16
Figure 11: Reverted rubber mark on main wheel .....	16

---

## ABBREVIATIONS AND DEFINITIONS

---

AC	: Advisory Circular
AIP	: Aeronautical Information Publication
AM	: Aerodrome Manual
AOC	: Aircraft Operator Certificate
ARFF	: Airport Rescue & Fire Fighting
ATC	: Air Traffic Control
ATPL	: Airline Transport Pilot License
ATS	: Air Traffic Services
AVSEC	: Aviation Security
CASR	: Civil Aviation Safety Regulation
Cb	: Cumulonimbus
C of A	: Certificate of Airworthiness
C of R	: Certificate of Registration
CVR	: Cockpit Voice Recorder
DGCA	: Directorate General of Civil Aviation
EGPWS	: Enhanced Ground Proximity Warning System
FDR	: Flight Data Recorder
ILS	: Instrument Landing System
IMC	: Instrument Meteorological Conditions
KNKT	: <i>Komite Nasional Keselamatan Transportasi</i> (National Transportation Safety Committee)
LT	: Local Time
MOS	: Manual Of Standard
NDB	: Non-Directional Beacon
NOTAM	: Notice to Airman
OLS	: Obstacle Limitation Surface
PA	: Passenger Address
PAPI	: Precision Approach Path Indicator
PF	: Pilot Flying
PIC	: Pilot in Command
PM	: Pilot Monitoring
SIC	: Second in Command
SOP	: Standard Operating Procedures
UTC	: Universal Time Coordinated
VMC	: Visual Meteorological Condition
RNAV	: Area Navigation

---

## SYNOPSIS

---

On 31 May 2017, a Boeing 737-300 aircraft registration PK-CJC was being operated on scheduled passenger flight by Sriwijaya Air with flight number SJ 570. The schedule flight route was from Hasanuddin Airport, Makassar, South Sulawesi to Rendani Airport, Manokwari, West Papua with a transit stop at Domine Eduard Osok Airport, Sorong, West Papua.

At 0220 LT (2020 UTC), the aircraft departed Sultan Hasanuddin Airport, Makassar and at 0815 LT (2315 UTC), the aircraft departed Domine Eduard Osok Airport, Sorong to Rendani Airport, Manokwari.

In this flight the Second in Command (SIC) acted as Pilot Flying (PF) and the Pilot in Command (PIC) acted as Pilot Monitoring (PM). On board this flight were two pilots, four flight attendants and 146 passengers. There was no report or record of aircraft technical system abnormality prior to the departure from Makassar until the time of occurrence.

During landing at Manokwari at 0850 LT (2350 UTC), the weather condition was slight rain with Cumulonimbus cloud viewed nearby the airport. The aircraft touchdown then overrun and stopped at approximate 20 meters from end of runway 35.

Some passengers had minor injury and the aircraft suffer substantially damage.

The investigation is continuing and will include details information of flight recorders, related procedures, human factors issue, flight technique and airport infrastructure and procedure.

In this Preliminary report, KNKT issued safety recommendation to PT. Sriwijaya Air, Rendani Airport, and Directorate General of Civil Aviation to address the identified safety issues.

---

# 1 FACTUAL INFORMATION

---

## 1.1 History of the Flight

On 31 May 2017, a Boeing 737-300 aircraft registration PK-CJC was being operated by PT. Sriwijaya Air as a scheduled passenger flight from Hasanuddin Airport (WAHH), Makassar, South Sulawesi to Rendani Airport (WAUU), Manokwari<sup>1</sup>, West Papua, with one transit stop at Domine Eduard Osok Airport (WASS) Sorong, West Papua. The flight was uneventful since the first departure from Makassar until commencing the approach at Manokwari.

At 0815 LT (2315 UTC<sup>2</sup>), the aircraft departed Sorong to Manokwari. On board in the flight were two pilots, four flight attendants and 146 passengers. On this flight, the Second in Command (SIC) acted as Pilot Flying (PF) and the Pilot in Command (PIC) acted as Pilot Monitoring (PM).

At 2331 UTC, the pilot made first contact to Rendani Tower controller and informed that the aircraft was descending from FL 230 (altitude 23,000 feet) and requested the weather information. The Rendani Tower controller informed to the pilot that the wind was calm, ground visibility 6 km, cloud<sup>3</sup> FEW CB 1,400 feet, temperature and dew point 26/25°C.

At 2336 UTC, Rendani Tower controller instructed to the pilot to descend to 11,000 feet and to report when on Visual Meteorological Condition (VMC).

At 2338 UTC, the pilot informed that they were on VMC condition and passed altitude 13,000 feet while position was 32 Nm from ZQ NDB (Non-Directional Beacon). Rendani Tower controller instructed to fly maintain on visual condition, fly via overhead, descend to circuit altitude, join right downwind runway 35, and to report when overhead Manokwari.

At 2344 UTC, the pilot reported that the aircraft was over Manokwari and Rendani Tower controller informed to the pilot that the visibility changed to 5 km. Two minutes later Rendani Tower controller instructed to the pilot to continue approach and to report on right base runway 35.

At 2349 UTC, at approximately 600 feet, the PIC as PM took over control by called “I have control” and the SIC replied “You have control”. A few seconds later the pilot reported that the aircraft was on final runway 35, and Rendani Tower controller instructed to the pilot to report when the runway 35 insight. The pilot immediately replied that the runway was in sight and acknowledged by Rendani Tower controller who then issued landing clearance with additional information that the wind was calm and the runway condition wet.

At approximately 550 feet, the PIC instructed the SIC turn on the wiper and reconfirmed to SIC that the runway was in sight.

---

<sup>1</sup> Rendani Airport (WAUU), Manokwari will be named as Manokwari for the purpose of this report.

<sup>2</sup> The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. Local time is UTC+7 hours.

<sup>3</sup> Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for FEW is when the clouds cover 2/8 up to 3/8 area of the sky and BKN (Broken) is when the clouds cover 4/8 up to 7/8 area of the sky



Between altitude 500 feet to 200 feet, the EGPWS aural warnings “Sink Rate” and “Pull Up” sounded.

At 2350 UTC, the aircraft touched down and rolled on runway 35. The spoiler deployed and the pilot activated the thrust reversers. The crew did not feel significant deceleration.

The aircraft stopped at approximate 20 meters from the end of runway pavement. After the aircraft stopped, the PIC commanded “Evacuate” through the Passenger Address (PA) system. The Rendani Tower Controller saw that the aircraft was overrun and activated the crash bell then informed the Airport Rescue and Fire Fighting (ARFF) that there was an aircraft overrun after landing on runway 35.

All the flight crew and passengers evacuated the aircraft and transported to the terminal building safely.

## 1.2 Injuries to Person

The passengers and crew were Indonesia citizens, and the table below shows the condition after the occurrence.

Injuries	Flight crew	Passengers	Total in aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	17	17	Not applicable
Nil	6	129	135	Not applicable
TOTAL	6	146	152	-

## 1.3 Damage to Aircraft

The aircraft was substantially damage. The damaged found on the nose landing gear, nose section lower fuselage, and both engine fan blades.



**Figure 1: Damage on the lower frame bulkhead of the nose landing gear compartment**



**Figure 2: Damage on left engine fan blades**

## **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**

The Pilot in Command (PIC) was 49 years old Indonesia male pilot, joined the company since 2005 and held valid Airline Transport Pilot License (ATPL). The first-class medical certificate was valid until 26 August 2017 with medical limitation to possess glasses that correct for near vision.

The last line check was performed on 18 February 2017 and last proficiency check on 10 November 2016.

The PIC qualified as Boeing 737-300 aircraft pilot with flying experiences as follows:

Total hours	: 13,371 hours
Total on type	: 3,110 hours
Last 90 days	: 238 hours 37 minutes
Last 60 days	: 171 hours 15 minutes
Last 24 hours	: 5 hours 30 minutes
This flight	: 50 minutes

### **1.5.2 Second in Command**

The Second in Command (SIC) was 42 years old Indonesia male pilot, joined company since 2010 and held valid Airline Transport Pilot License (ATPL). The first-class medical certificate was valid until 25 July 2017 with medical limitation to wear lenses that correct for distant vision and to possess glasses that correct for near vision.

The last line check was performed on 18 February 2017 and last proficiency check on 17 January 2017.

The SIC qualified as Boeing 737-300 aircraft pilot with flying experiences as follows:

Total hours : 5,570 hours  
 Total on type : 2,523 hours  
 Last 90 days : 238 hours 37 minutes  
 Last 60 days : 151 hours 20 minutes  
 Last 24 hours : 5 hours 30 minutes  
 This flight : 50 minutes

### 1.5.3 Flight Attendant

All flight attendants on this flight held valid certificates and medical licenses.

### 1.6 Aircraft Information

The aircraft manufactured by Boeing Company in 1988 in United States of America, with serial number 24025 and the type/model was B737-33A. The aircraft registered PK-CJC had Certificate of Airworthiness (C of A) valid until 24 July 2017 and Certificate of Registration (C of R) valid until 12 April 2020.

The aircraft engines manufactured by CFM International in United States of America with type/model of CFM56, the engine one (left engine) serial number (SN) was 858288 and the engine two (right engine) SN was 724478.

The total flight hour and cycle for both engines were as follow:

Engine one

- Time Since New : 44,928 FH
- Cycle Since new : 28,998 FC

Engine two

- Time Since New : 60,428 FH
- Cycle Since new : 37,830 FC

The last inspection (A9 Check) was conducted on 21 May 2017 when the aircraft at 60,996 flight hours.

### 1.7 Meteorological Information

The meteorological reports issued on 31 May 2017 were as follows:

	2300 UTC	2330 UTC	0000 UTC
Wind (°/knots)	Calm	Calm	260/02
Visibility (m)	6,000 m	5,000 m	5,000 m
Weather	Thunderstorm and rain	Rain	Rain
Cloud <sup>4</sup>	FEW CB 1,400 feet	FEW CB 1,400 feet	BKN 1,300 feet
TT/TD (°C)	26 / 25	26 / 25	26 / 25
QNH (mbs/in Hg)	1,011	1,011	1,012

<sup>4</sup> Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for FEW is when the clouds cover 3/8 up to 4/8 and Broken (BKN) is when the clouds cover 5/8 up to 7/8 area of the sky.

## 1.8 Aids to Navigation

The navigation aids available at Manokwari was Non-Directional Beacon (NDB) with identification ZQ. There was no NDB instrument approach procedure available in Manokwari.

Approach guidance facilities such as Precision Approach Path Indicator (PAPI) lights were serviceable.

The RNAV<sup>5</sup> (Area Navigation) approach chart provided by Directorate General of Civil Aviation (DGCA) on Aeronautical Information Publication (AIP) Volume III is showed as the figures below.

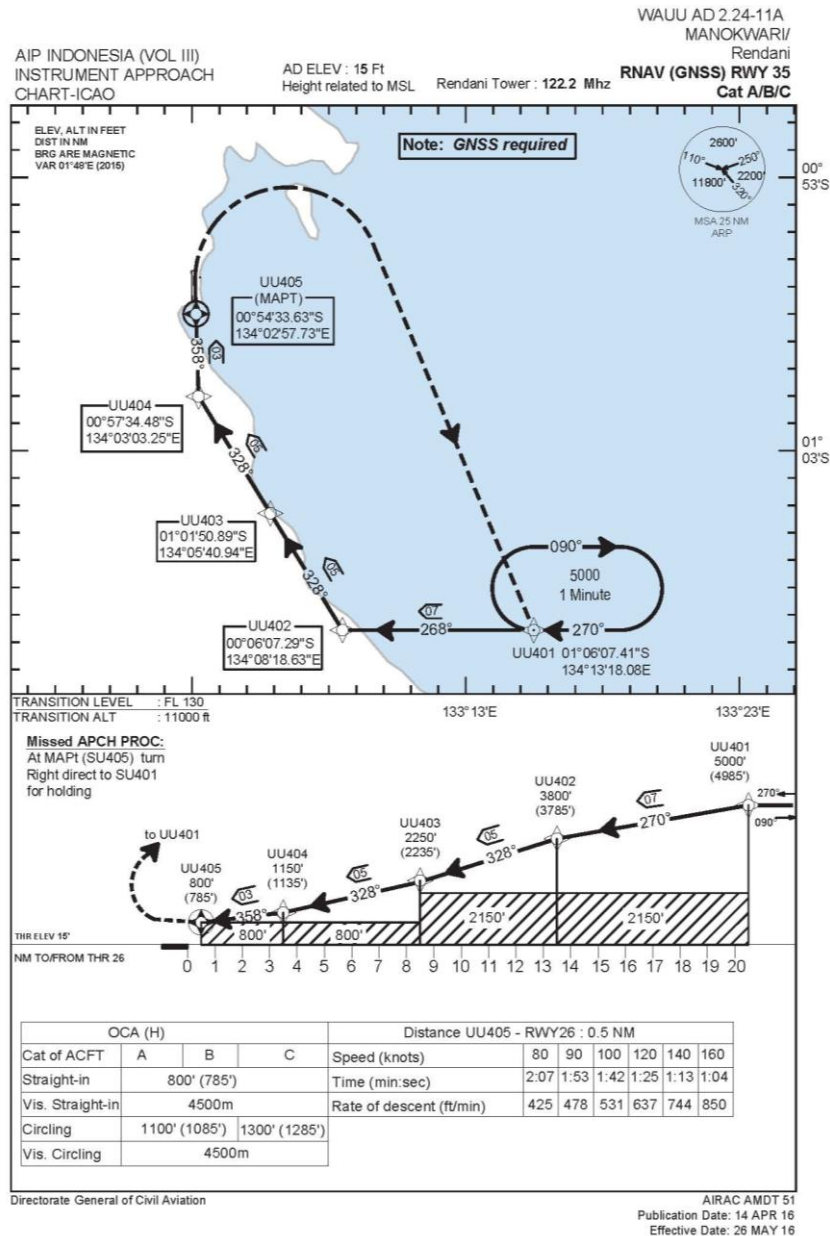


Figure 3: The published RNAV approach chart for runway 35

<sup>5</sup> RNAV is a method of navigation which permits the operation of an aircraft on any desired flight path; it allows its position to be continuously determined wherever it is rather than only along tracks between individual ground navigation aids.

## 1.9 Communications

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

The excerpt of the communication will be included in the final report.

## 1.10 Aerodrome Information

The information of the airport refers to the Aeronautical Information Publication (AIP) are as follow:

Airport Name	:	Rendani Airport
Operating Hours	:	21.00 UTC until 08.00 UTC
Airport Address	:	Jl.Trikora, Rendani PO BOX 164, Manokwari, Papua Barat, 98315
Airport Identification	:	WAUU / MKW
Airport Authority	:	DGCA
Airport Certificate Number	:	-
Type of Traffic Permitted	:	VFR
Coordinate	:	00° 53' 38" S; 134° 03' 01" E
Elevation	:	15 feet
Runway Direction	:	17 – 35
Runway Length	:	2,000 m
Runway Width	:	45 m
Surface	:	Asphalt

### Runway observation one day after the occurrence

The investigation conducted observation to the runway condition, one day after the occurrence. The summary of the observation are as follows:

- Several areas of the runway surface warp (curving) in approximate 2 - 5 square meters with standing waters on the runway during and after rain. The CCTV recorded water splash when the accident aircraft landed and rolled on runway 35.
- Several runway edge lights were covered with grass that approximately of 30-40 cm high.



**Figure 4: Grass on the runway edge**



**Figure 5: Warp area on the runway surface**



**Figure 6: Standing water in the warp runway surface**



**Figure 7: The water splash of accident aircraft landed & rolled on runway 35 recorded on CCTV**

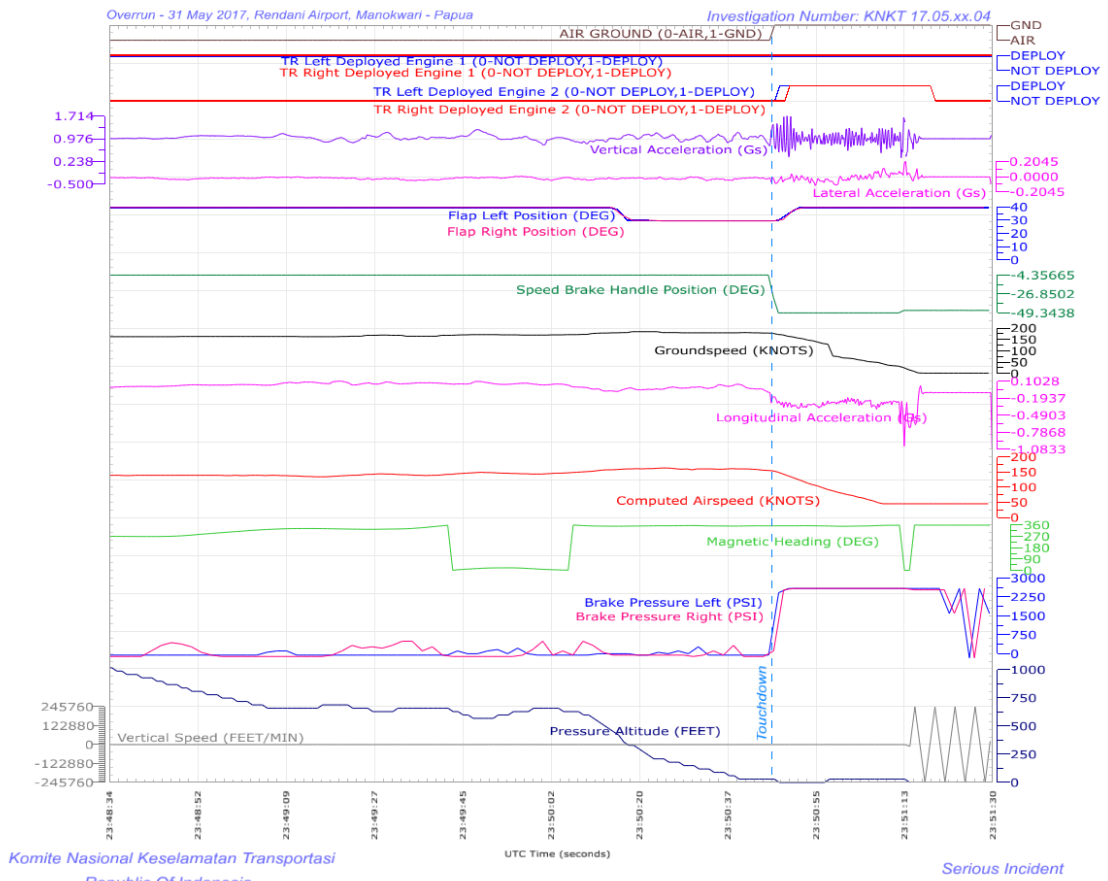
## **1.11 Flight Recorders**

### **1.11.1 Flight Data Recorder**

The aircraft was fitted with Honeywell L3-Comm FA2100 model with part number 2100-4043-00 and serial number 000281537. The recorder was transported to KNKT recorder facility for data downloading process.

Few of FDR parameters from approximate 350 feet prior the aircraft landing on runway 35 were downloaded and showed in the figure below.

## PK-CJC Boeing 737-33A



**Figure 8: The significant FDR parameters**

### 1.11.2 Cockpit Voice Recorder

The aircraft was fitted with L3-Comm A200S model with part number S200-0012-00 and serial number 02700. The recorder was transported to KNKT recorder facility for data downloading process. The CVR recorded 120 minutes of good quality recording data including the accident flight.

The significant excerpts from the CVR in approximate one minute prior to touchdown when the control has been taken over by the PIC, are as follow:

- 23:49:36 The PIC called that the runway insight
- 23:49:38 The SIC confirming that the runway insight
- 23:49:40 Rendani Tower controller acknowledged and issued landing clearance with additional information that the wind was calm and the runway condition wet.
- 23:49:47 SIC acknowledged
- 23:50:04 PIC requested to the SIC to turn on the wiper.
- 23:50:13 GPWS aural warning “Sink rate”
- 23:50:15 GPWS altitude call “500”
- 23:50:17 GPWS aural warning “Pull up” 2 times
- 23:50:18 GPWS altitude call “300”



23:50:20 GPWS aural warning “Sink Rate” 2 times  
23:50:24 GPWS altitude call “200”  
23:50:33 GPWS altitude call “100”  
23:50:37 GPWS altitude call “50”  
23:50:38 GPWS altitude call “40”  
23:50:39 GPWS altitude call “30”  
23:50:40 GPWS altitude call “20”  
23:50:41 GPWS altitude call “10”  
23:50:47 Aircraft touched down the runway  
23:51:25 PIC command “Evacuate”  
23:51:52 End of Recording

## 1.12 Wreckage and Impact Information

The aircraft stopped with the main wheels were at approximately 20 meters from end of runway 35 and all emergency exit slides deployed. The aircraft was substantially damaged, nose landing gear broken and folded backward into the electronic compartment, both fan blades on engine found damage, and damage on some fuselage areas. Reverted rubber marks found on the main landing gear tire.

Observation on the runway found white tire marks on the aircraft trajectory.



**Figure 9: The aircraft position after stop**



**Figure 10: White marks of main wheel on runway along the aircraft trajectory**



**Figure 11: Reverted rubber mark on main wheel**

### **1.13 Medical and Pathological Information**

No medical or pathological examination conducted as result of this occurrence.

### **1.14 Fire**

There was no evidence of pre- or post-impact fire.

### **1.15 Survival Aspect**

The passenger evacuated the aircraft through the emergency escape slides, and 17 of 146 passengers suffered minor injury.

The detail of the evacuation process will be included in the final report.

## 1.16 Test and research

Prior to the issuance of this report, there was no test and research has been conducted. Should any test and research perform during the investigation, it would be included in the final report.

## 1.17 Organizational and Management Information

### 1.17.1 The Aircraft Operator

Aircraft Owner : PT. Sriwijaya Air  
Address : Jalan Pangeran Jayakarta No.68 Block C 15-16  
Jakarta Pusat – Indonesia  
Aircraft Operator : PT. Sriwijaya Air  
Address : Jalan Pangeran Jayakarta No.68 Block C 15-16  
Jakarta Pusat – Indonesia

PT. Sriwijaya Air had a valid Air Operator Certificate (AOC) number 121-035 to conduct scheduled passenger transport.

The operator operated 9 Boeing 737-300 aircraft, 7 Boeing 737-500 aircraft, 22 Boeing 737-800 aircraft, and 2 Boeing 737-900ER.

The detail of the organization information will be included in the final report.

### 1.17.2 Aircraft Operator Manual

The relevant parts of the operator's standard operating procedure which related to the analysis of this accident is collected, and listed in this subchapter.

#### 1.17.2.1 Stabilized Approach (Boeing 737-300 FCTM page 5.4)

##### *Stabilized Approach Recommendations*

*Maintaining a stable speed, descent rate, and vertical/lateral flight path in landing configuration is commonly referred to as the stabilized approach concept.*

*Any significant deviation from planned flight path, airspeed, or descent rate should be announced. The decision to execute a go-around is not an indication of poor performance.*

***Note:** Do not attempt to land from an unstable approach.*

##### *Recommended Elements of a Stabilized Approach*

*The following recommendations are consistent with criteria developed by the Flight Safety Foundation.*

*All approaches should be stabilized by 1,000 feet AFE in instrument meteorological conditions (IMC) and by 500 feet AFE in visual meteorological conditions (VMC). An approach is considered stabilized when all of the following criteria are met:*

- the airplane is on the correct flight path*
- only small changes in heading and pitch are required to maintain the correct flight path*
- the airplane should be at approach speed. Deviations of +10 knots to -5 knots are acceptable if the airspeed is trending toward approach speed.*

- *the airplane is in the correct landing configuration*
- *sink rate is no greater than 1,000 fpm; if an approach requires a sink rate greater than 1,000 fpm, a special briefing should be conducted*
- *thrust setting is appropriate for the airplane configuration*
- *all briefings and checklists have been conducted.*

*Specific types of approaches are stabilized if they also fulfill the following:*

- *ILS approaches should be flown within one dot of the glide slope and localizer, or within the expanded localizer scale (as installed)*
- *during a circling approach, wings should be level on final when the aircraft reaches 300 feet AFE.*

*Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.*

**Note:** *An approach that becomes un-stabilized below 1,000 feet AFE in IMC or below 500 feet AFE in VMC requires an immediate go-around.*

*These conditions should be maintained throughout the rest of the approach for it to be considered a stabilized approach. If the above criteria cannot be established and maintained until approaching the flare, initiate a go-around.*

*At 100 feet HAT for all visual approaches, the airplane should be positioned so the flight deck is within, and tracking to remain within, the lateral confines of the runway edges extended.*

*As the airplane crosses the runway threshold it should be:*

- *Stabilized on approach airspeed to within + 10 knots until arresting descent rate at flare*
- *On a stabilized flight path using normal maneuvering*
- *Positioned to make a normal landing in the touchdown zone (the first 3,000 feet or first third of the runway, whichever is less).*

*Initiate a go-around if the above criteria cannot be maintained.*

### **1.17.3 Airport Operator**

#### **Operator manuals**

Rendani Airport has an Aerodrome Manual (AM) as guidelines in the airport operation. The manual has not been approved by DGCA at the time of accident. The guidelines were described in more detail on another manual named Standard Operating Procedures (SOPs). The AM and SOPs are presented only in *Bahasa Indonesia* (Indonesia national language) and translated into English by KNKT for the purpose of this report.

Some parts of the current Aerodrome Manuals and the Standard Operating Procedures such as, runway operation and maintenance programs are shown in the following subchapter below.

### 1.17.3.1 Aerodrome Manual

#### **Bab 4 Prosedur Pengoperasian Bandar Udara**

#### **Chapter 4 Airport Operational Procedure**

#### **4.5 Pemeriksaan di Daerah Pergerakan dan Obstacle Limitation Surface**

#### **4.5 Inspection of Movement Area and Obstacle Limitation Surface**

##### **4.5.1 Tujuan**

##### **4.5.1 Objective**

Tujuan dari prosedur ini adalah untuk memastikan bahwa wilayah pergerakan, fasilitas terkait, dan obstacle limitation surfaces (OLS) secara rutin diperiksa untuk memastikan bahwa standar keselamatan penerbangan tetap dipenuhi.

The objective of this procedure is to ensure that movement area, related facilities and obstacle limitation surfaces (OLS) is examined regularly to ensure aviation safety standards is maintained.

##### **4.5.5 Prosedur dan Frekuensi Inspeksi Serviceability**

##### **4.5.5 Procedure and frequency of serviceability inspection**

Pemeriksaan di daerah pergerakan dan obstacle limitation surface harus dilakukan oleh personel teknisi Bangun dan landasan sebagai berikut:

Inspection on the movement area and obstacle limitation surface shall be carried out by building and runway technician, and conducted as follow:

1. Pemeriksaan harian sebelum dan setelah jam operasional dilaksanakan pada jam 20.00 UTC+9 dan 08.00 UTC+9.
2. Setelah hujan deras, angin keras atau fenomena signifikan lain yang diperkirakan dapat mempengaruhi serviceability suatu Bandara Udara;
3. Jika diminta oleh petugas ATC (misal: setelah suatu pendaratan abnormal); atau
4. Jika disarankan oleh suatu sumber yang dapat dipercaya seperti ground staff, pilot atau perwakilan maskapai penerbangan, bahwa kemungkinan ada masalah di movement area.

1. Daily inspection is performed before and after the flight operation at 20.00 UTC +9 (or 05.30 LT) and 08.00 UTC +9 (or 17.00 LT);
2. After heavy rain, strong wind or other significant phenomena that may affect the airport serviceability;
3. If requested by ATC (such as after an abnormal landing event); or
4. If recommended by other trusted sources such as ground staff, pilot or airline representative related to the possibility of abnormal event in movement area.

##### **4.5.8 Pengukuran Water Depth Di Runway**

##### **4.5.8 Water Depth Measurement on Runway**

Pemeriksaan rutin di movement area dilakukan oleh petugas AVSEC sebelum jam operasional penerbangan, hasil pemeriksaan dimasukkan dalam laporan pemeriksaan, bila dijumpai water depth, personel pemeriksa menginformasikan kepada Personel Teknisi Bangland untuk penanggulangannya. Hasil pengecekan/

Routine inspection in the movement area is carried out by the AVSEC officer before operation hours, inspection results are included in the inspection report, when the water depth is found, the inspection personnel informs to the building and runway technician for handling. The results of checks by building and runway

pemeriksaan oleh Personel Teknis Bangland dimasukkan dalam data Laporan Hasil Pemeriksaan untuk diproses lebih lanjut.

technician are included in the Inspection Result Report data for further processing

#### **4.7 Pemeliharaan Daerah Pergerakan (Movement Area)**

#### **4.7 Maintenance of Movement Area**

##### **4.7.1 Tujuan**

##### **4.7.1 Purpose**

Tujuan dari prosedur ini untuk pemeliharaan rutin permukaan area pergerakan dan system drainase untuk memastikan bahwa kinerja (performance) area pergerakan tidak berkurang.

The purpose of this procedure is for routine maintenance of movement area surface and drainage system to ensure that the performance is not falls off.

##### **4.7.5 Perawatan Daerah Pergerakan Pesawat Udara (Runway, Taxiway, dan Apron)**

##### **4.7.5 Movement Area Maintenance (Runway, Taxiway, and Apron)**

1. Kerusakan daerah pergerakan diperbaiki sesuai dengan level kerusakan.
2. Pemeliharaan dan pembersihan dilakukan secara mingguan.
3. Jika terdapat FOD dilakukan secara manual dan menggunakan peralatan penyapu runway jika diperlukan.
4. Personel Teknisi Bangland akan melakukan pembersihan jika terdapat tumpahan minyak/bahan bakar pesawat udara di apron.
5. Pengujian kekesatan dan pembersihan rubber deposit dilaksanakan oleh unit Bangland.
6. Pengecatan marking dilakukan secara tahunan

1. Damaged to the movement area is corrected according to the level of damage.
2. Maintenance and cleaning shall conduct weekly.
3. If FOD is detected, cleaning shall conduct manually and using runway sweeper machine if required.
4. Technician personnel of building and runway will clean any oil/fuel spill on the apron.
5. Friction test and rubber deposit removal conducted by building and runway unit.
6. Repainting marking shall be done annually.

##### **4.7.6 Perawatan Area Tanpa Perkerasan**

##### **4.7.6 Maintenance on Non-Pavement Area**

1. Pemotongan rumput dilaksanakan secara harian.
2. Pemotongan rumput menggunakan Tractor Mower dan Rotary Mower.

1. Grass cutting performs on daily basis.
2. Grass cutting uses Tractor Mower and Rotary Mower.

##### **4.7.8 Perawatan Sistem Drainase Bandara**

##### **4.7.8 Airport Drainage Maintenance**

1. Pemeriksaan dan pengontrolan

1. The inspection and control performs

dilakukan minimal setiap hari.

2. Pemeliharaan dilakukan sedemikian rupa sehingga kondisi saluran selalu terjaga dengan baik.

#### **4.7.9 Level Pemeliharaan**

1) Pemeliharaan Level I, termasuk didalamnya pemeliharaan preventif periodik tiga kali sehari, yang meliputi pembersihan permukaan, struktur perkerasan dan pengecekan marking yang dilakukan oleh personel.

2) Pemeliharaan Level II, dilakukan pada saat kebutuhan meningkat. Adalah pemeliharaan korektif, termasuk melakukan rekondisi permukaan landasan yang mengalami kerusakan kecil/minor, pembersihan rubber deposit dan pengecatan marka.

3) Pemeliharaan Level III, diklasifikasikan sebagai pemeliharaan korektif dan akan dilakukan pada saat terjadi malfunction yang tidak dapat diperbaiki oleh Pemeliharaan Level II. Pemeliharaan diterapkan dengan kesediaan peralatan berat.

daily.

2. The maintenance shall be conduct so that the condition of drainage is always well preserved.

#### **4.7.9 Maintenance Level**

1) Maintenance Level I, including preventive maintenance performs periodically three times a day consists of surface cleaning, pavement structure and marking which performs by personnel.

2) Maintenance Level II, performs if the demand is increase. It is a corrective maintenance, including recondition of runway minor damage surface which have minor damaged, rubber deposit removal, and repainting the marking.

3) Maintenance Level III, classified as corrective maintenance that will be performed if there is malfunction which cannot be repaired on Level II Maintenance. This maintenance is specially performed by heavy equipment.

### **1.17.3.2 Aerodrome Inspection Procedure**

#### **3.1 Jadwal Inspeksi**

Inspeksi dilakukan 3 (tiga) kali dalam sehari sebagai berikut:

1. Inspeksi pada pagi hari antara jam 05.00-06.00 WIT
2. Inspeksi pada siang hari antara jam 11.00-12.00 WIT
3. Inspeksi pada sore hari sesudah penerbangan terakhir (jam operasi Bandara tutup)

#### **3.1 Inspection Schedule**

Inspection is performed 3 (three) times a day as follows:

1. Morning inspection between 05.00-06.00 LT;
2. Midday inspection between 11.00-12.00 LT;
3. After flight activities terminated inspection

### **1.17.4 Air Navigation Provider**

The air traffic services in Manokwari are provided by AirNav Indonesia branch office Manokwari. Relevant information related to the air navigation provider will be included in the final report.

### 1.17.5 DGCA of Indonesia Regulations

Regulations and standards related to the aerodrome certification, runway operation and maintenance is described in the Civil Aviation Safety Regulation (CASR) Part 139, Manual of Standard (MOS) CASR Part 139, and Advisory Circular (AC) CASR Part 139. The relevant regulations and standards are summarized as follow.

#### 1.17.5.1 Manual of Standard CASR Part 139

##### **3. Permohonan Untuk Mendapatkan Sertifikat Bandara**

###### **3.1. Pendahuluan**

3.1.1. Menurut PKPS Bagian 139, bandar udara yang ditujukan untuk mengakomodasi pesawat udara yang melaksanakan operasi penerbangan internasional, atau operasi transportasi udara lainnya yang menggunakan pesawat udara dengan tempat duduk lebih dari 30 kursi penumpang, harus disertifikasi. Operator bandar udara lainnya juga dapat mengajukan sertifikasi bandar udara.

3.1.2. Pemohon adalah pemilik dari lokasi bandar udara, atau telah mendapatkan ijin dari pemilik untuk menggunakan lokasi dimaksud sebagai bandar udara.

3.1.3. Proses sertifikasi bandar udara dari Ditjen Hubud hanya mengatur aspek keselamatan operasi bandar udara. Adalah tanggung jawab pemohon untuk memastikan bahwa penggunaan lokasi sebagai bandar udara sejalan dengan persyaratan lain dari Ditjen Hubud atau Pemerintah Daerah. Sertifikat Bandar udara tidak membebaskan pemohon untuk memperhatikan persyaratan lainnya yang ditentukan oleh pihak berwenang yang terkait.

3.1.4. Sebelum mengajukan permohonan, pemohon harus menyiapkan Aerodrome Manual, sesuai dengan ketentuan dalam PKPS Bagian 139. Standar untuk memenuhi persyaratan ditetapkan di beberapa bab dalam Manual of Standar (MOS) ini. Permohonan awal harus dibuat dengan menggunakan formulir

##### **3. Application for Aerodrome Certificate**

###### **3.1. Introduction**

3.1.1. Refer to CASR Part 139, aerodrome that is intended to accommodate aircraft for international flight or other air transportation with aircraft having seat capacity more than 30 passenger seats, shall be certified. Other airport operators may also apply for aerodrome certificate.

3.1.2. The applicant shall be the owner of the aerodrome, or authorized by the owner to use the site to be an aerodrome.

3.1.3 Certification process for DGCA aerodrome only addresses to the aviation safety aspect of the aerodrome. It is the responsibility of the applicant to ensure that usage of the site as an aerodrome is comply with other requirements of DGCA, or local government. The aerodrome certificate does not absolve the applicant from observing other requirements of related authority.

3.1.4. Prior to submit an application, the applicant must prepare an Aerodrome Manual, in accordance with the requirements set out in CASR Part 139. The standards to meet the requirements are set out in several chapters in this Manual of Standards (MOS). The initial application must be made in a form as



terlampir di Lampiran A manual ini. Formulir yang telah dilengkapi dikembalikan ke kantor Ditjen Hubud, bersama dengan salinan Aerodrome Manual dan Manual Sistem Manajemen Keselamatan Bandar Udara.

### **3.5. Pemberian Sertifikat Bandar Udara**

3.5.1. Sebelum sertifikat bandar udara diberikan, beberapa hal berikut harus sudah dapat diterima oleh Ditjen Hubud:

- a. karakteristik fisik dan fasilitas bandar udara telah sesuai dengan standar yang relevan atau sudah mencukupi kebutuhan keselamatan pesawat udara;
- b. prosedur operasional bandar udara yang diajukan oleh pemohon dan dijabarkan dalam Aerodrome Manual sudah tepat dan memenuhi untuk suatu tingkat kegiatan pesawat udara yang diharapkan di Bandar Udara;
- c. adanya personel yang memadai yang telah dilatih atau berkualifikasi untuk melakukan fungsi keselamatan Bandar Udara;
- d. operator bandar udara paham akan fungsi keselamatan dan dapat mengoperasikan bandar udara secara benar; dan
- e. Sistem manajemen keselamatan yang dapat diterima dan diterapkan di bandar udara.

### **10.2. Inspeksi dan Pelaporan Aerodrome Serviceability**

10.2.3. Kondisi permukaan pada area pergerakan (Movement Area), termasuk keberadaan air. Inspeksi harus dilakukan untuk memeriksa keberadaan:

- a. Air di permukaan; informasi kondisi air yang ada di permukaan runway agar mengikuti terminology sebagai berikut:
  - DAMP – perubahan warna permukaan yang karena kelembaban
  - WET — permukaan basah tetapi tidak ada STANDING WATER.

attached at Appendix A of this manual. The completed form shall be returned to DGCA office, together with copy of the Aerodrome Manual and Airport Safety Management System manual.

### **3.5. Granting of an Aerodrome Certificate**

3.5.1. Before an aerodrome certificate is granted, DGCA needs to be satisfied that:

- a. the physical characteristics and airport facilities are in compliance with relevant standards or are adequate for aircraft safety;
- b. the aerodrome operating procedures proposed by the applicant and set out in the Aerodrome Manual are appropriate and adequate for the expected level of aircraft activities at the aerodrome;
- c. trained or qualified personnel sufficient to conduct the safety functions of the aerodrome;
- d. the aerodrome operator is aware of the aerodrome safety functions and able to operate the aerodrome properly; and
- e. Safety Management System is acceptable and applied at the airport.

### **10.2. Inspection and Reporting Aerodrome Serviceability**

10.2.3. Surface condition of the Movement Area, including the presence of water. The inspection must be performed to check for the presence of:

- a. Water on the surface; information on water conditions presence on the runway surface must follow the following terminology:
  - DAMP – the changes of surface color due to the moisture
  - WET — the surface is wet but there is no STANDING WATER.

- **STANDING WATER** — untuk operasional pesawat udara, lebih dari 25 persen dari luas permukaan (baik di area yang terisolasi atau tidak) runway dengan panjang dan lebar yang ditutupi oleh air dengan kedalaman lebih dari 3 mm

k. Inspeksi juga harus memeriksa bagian runway yang mungkin licin saat basah. Terutama pada daerah perkerasan runway yang tidak memenuhi ketentuan kekesatan/ gesekan runway yang ditetapkan oleh Ditjen Hubud.

#### 10.2.11. Check List Inspeksi

Operator bandar udara harus membuat checklist inspeksi untuk petugas yang melaksanakan aerodrome serviceability inspection untuk memastikan kelengkapan/keseluruhan dalam setiap inspeksi.

#### 10.2.12. Logbooks Inspeksi

Operator bandar udara harus memelihara logbook inspeksi yang digunakan untuk mencatat tanggal dan waktu setiap pelaksanaan aerodrome serviceability inspection dan juga hasil dari setiap inspeksi serta berbagai langkah tindak lanjut yang diambil. Logbook harus disimpan setidaknya selama 2 tahun.

### 10.3. Pengajuan Penerbitan NOTAM

#### 10.3.2. Perubahan yang dilaporkan ke NOTAM office

10.3.2.2. Informasi berikut harus dilaporkan ke NOTAM office:

- Adanya atau hilangnya atau perubahan signifikan, kondisi bahaya yang disebabkan oleh lumpur atau air di area pergerakan (wet atau standing water);

- **STANDING WATER** — For aircraft operations, more than 25 percent of the runway surface area (either in an isolated area or not) of length and width covered by water with a depth of more than 3 mm

k. Inspections should also check for runway parts that may be slippery when wet. Especially in runway pavement areas that do not meet the requirements of runway friction determined by DGCA.

#### 10.2.11. Check List Inspection

The aerodrome operator must make an inspection checklist for personnel carry out an aerodrome serviceability inspection to ensure completion on each inspection.

#### 10.2.12. Inspection Logbooks

The aerodrome operator must maintain aerodrome inspection logbooks for recording the date and time of each aerodrome serviceability inspection, the results of each inspection and any action taken. Logbooks must be retained for at least 2 years.

### 10.3. Application for publishing NOTAM

#### 10.3.2. Changes reported to NOTAM office

10.3.2.2. the following information shall be reported to NOTAM office:

- Present or missing or significant change, hazard that caused by mud or water in the movement area (wet or standing water);

The investigation found that the airport has not held valid Airport Certificate at the time of accident.

Prior to the occurrence, the weather on the airport was slight rain and there was standing water on the runway.

### **1.18 Additional Information**

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.

### **1.19 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<sup>6</sup>

---

According to factual information during the investigation, the Komite Nasional Keselamatan Transportasi identified initial findings as follows:

1. The aircraft was airworthy prior to the accident, there was no report or record of aircraft system abnormality during the flight. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
2. The aircraft operator had a valid Air Operator Certificate (AOC) to conduct a scheduled passenger transport.
3. The crew held valid licenses and medical certificates.
4. The weather conditions during aircraft approach and landing was slight rain with cumulonimbus viewed nearby the airport, wind was calm and runway was wet.
5. In this flight Second in Command (SIC) acted as Pilot Flying (PF) and the Pilot in Command (PIC) acted as Pilot Monitoring (PM). The PIC took over control from the SIC during approach at altitude approximately 600 feet.
6. At approximate 550 feet, the PIC instructed the SIC to turn on the wiper and reconfirmed to SIC that the runway was in sight.
7. Between altitude 500 feet to 200 feet, the EGPWS aural warnings “Sink Rate” and “Pull Up” sounded.
8. The CCTV recorded water splash when aircraft on landing roll.
9. Several area of the runway warp in approximate 2 - 5 meters square meters with standing waters on the runway of Rendani Airport.
10. Several runway lights covered by grass with the height approximately of 30-40 cm.
11. Rendani Aerodrome Manual (AM) as general guidelines in the airport operation had not been approved by the DGCA at the time of accident.
12. Rendani Airport (WAUU), Fire fighting category III refer to AIP amended on April 2015.

---

<sup>6</sup> 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.

---

### **3 SAFETY ACTION**

---

At the time of issuing this preliminary report, the Komite Nasional Keselamatan Transportasi has not been informed of any safety actions resulting from this occurrence.

---

## **4 SAFETY RECOMMENDATIONS**

---

According to factual information and findings gathered, the Komite Nasional Keselamatan Transportasi (KNKT) issued safety recommendations to address the safety issues identified in this preliminary report.

### **4.1 PT. Sriwijaya Air**

- **04.O-2017-17.1**

During the approach between altitude 500 feet to 200 feet, the EGPWS aural warnings “Sink Rate” and “Pull Up” active, however the pilot elected to land the aircraft.

KNKT recommends the aircraft operator to improve the flight crew understanding and application of Stabilize Approach Criteria.

### **4.2 Rendani Airport**

- **04.B-2017-17.2**

The runway observation and CCTV record indicated that standing water present on the runway surface during and after rain and several runway lights were covered by grass.

Refer to the aforesaid condition, KNKT recommends the airport operator to takes necessary action to minimize the present of standing water and maintain the runway lighting system alongside of runway.

### **4.3 Director General of Civil Aviation (DGCA)**

- **04.R-2017-17.3**

Rendani airport has not held Aerodrome Certificate and the Aerodrome Manual (AM) has not been approved by DGCA at the time of accident. KNKT recommend DGCA to process the certification of aerodrome certificate for the Rendani airport.

---

## **5 APPENDICES**

---

**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](mailto:knkt@dephub.go.id)