

PRELIMINARY
KNKT.15.12.28.04

KOMITE NASIONAL KESELAMATAN TRANSPORTASI

Aircraft Accident Investigation Report

**PT. KalStar Aviation
Embraer 190-200LR; PK-KDC
El Tari Airport
Kupang, Nusa Tenggara Timur
Republic of Indonesia
21 December 2015**



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA
2016**



This Preliminary report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), 3rd Floor Ministry of Transportation, 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 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

TABLE OF CONTENTS	i
TABLE OF FIGURES	iii
ABBREVIATIONS AND DEFINITIONS	iv
INTRODUCTION	vi
1 FACTUAL INFORMATION	1
1.1 History of the Flight	1
1.2 Injuries to Persons	2
1.3 Damage to Aircraft	3
1.4 Other Damage.....	4
1.5 Personnel Information	4
1.5.1 Pilot in Command.....	4
1.5.2 Second in Command	5
1.5.3 Flight Attendants	5
1.6 Aircraft Information	6
1.6.1 General	6
1.6.2 Engines	6
1.6.3 Weight and Balance.....	7
1.7 Meteorological Information.....	7
1.7.1 Automatic Terminal Information Service (ATIS).....	7
1.7.2 Automated Weather Observation System (AWOS).....	8
1.7.3 Meteorological Information by Tower Set.....	8
1.7.4 Visibility Chart	9
1.7.5 Determination of Wind Information.....	10
1.8 Aids to Navigation.....	11
1.9 Communications	12
1.10 Aerodrome Information	12
1.11 Flight Recorders	13
1.12 Wreckage and Impact Information	14
1.13 Medical and Pathological Information	16
1.14 Fire.....	16
1.15 Survival Aspects	16
1.16 Tests and Research	17

1.17	Organizational and Management Information.....	18
1.17.1	Aircraft Owner and Operator	18
1.17.2	Air Traffic Services Provider	18
1.18	Additional Information	18
1.19	Useful or Effective Investigation Techniques	18
2	FINDINGS.....	19
3	SAFETY ACTION	20
4	SAFETY RECOMMENDATIONS	21
4.1	PT. KalStar Aviation	21
4.2	AirNav District Office Kupang	21
5	APPENDICES.....	22
5.1	Safety Notice	22
5.2	Notice to Flight Attendant	23
5.3	Proficiency check syllabus training	24

TABLE OF FIGURES

Figure 1: The damaged right wing	3
Figure 2: The broken runway light	4
Figure 3: The display of AWOS	8
Figure 4: AWOS display (left) and Tower Set display (right)	9
Figure 5: Visibility chart	10
Figure 6: Meteorological sensor and windsock locations	11
Figure 7: RNAV approach runway 07 chart published by Jeppesen.....	12
Figure 8: The graph of several flight data parameters.....	14
Figure 9: Illustration of accident	14
Figure 10: the aircraft final position	15
Figure 11: The flap selector observed at aircraft final position.....	15
Figure 12: The illustration of ground surface	16
Figure 13: The aircraft location on grid map.....	16

ABBREVIATIONS AND DEFINITIONS

ADC	:	Aerodrome Control Tower
ARFF	:	Airport Rescue and Fire Fighting
ATC	:	Air Traffic Control
ATIS	:	Automatic Terminal Information Service
ATPL	:	Air Transport Pilot License is the highest level of aircraft pilot licence
ATS	:	Air Traffic Services
AWOS	:	Automatic Weather Observation System
BMKG	:	Badan Meterologi Klimatologi dan Geofisika (Metrological Climatology and Geophysical Agency)
°C	:	Degrees Celsius
CASR	:	Civil Aviation Safety regulation
CB	:	Cumulonimbus cloud
DGCA	:	Directorate General Civil Aviation
EGPWS	:	Enhanced Ground Proximity Warning System
DVDRs	:	Digital Voice and Data Recorder
FIR	:	Flight Information Region
FL	:	Flight Level
FMS	:	Flight Management System.
GNSS	:	Global Navigation Satellite System
FSS	:	Flight Service Station
Ft	:	Feet a unit of length
CG	:	Centre of Gravity
ICAO	:	International Civil Aviation Organization
In Hg	:	Inch Hydrargyrum
Kg	:	Kilogram (s)
Km	:	Kilometer (s)
KNKT	:	Komite Nasional Keselamatan Transportasi
Kts	:	Knots (Nm/hours)
LPPNPI	:	<i>Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia/</i> AirNav Indonesia, Air traffic service provider.
LT	:	Local time
MAC	:	Mean Aerodynamic Chord

mbs	:	Millibars
Nm	:	Nautical mile(s)
PAPI	:	Precision Approach Path Indicator
PF	:	Pilot Flying
PFD	:	Primary flight display
PIC	:	Pilot in Command
P/N	:	Part Number
QFE	:	Height above mean sea level based on surface pressure at the airfield reference point
QNH	:	Height above mean sea level based on local station pressure
RNAV	:	Area Navigation is 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.
S/N	:	Serial Number is a unique code assigned to uniquely identify an item
SIC	:	Second in Command
SOP	:	Standard Operating Procedures
UTC	:	Universal Time Coordinate
TAFOR	:	Terminal Area Forecast
VOR/DME	:	Very High Frequency Omnidirectional/Distance Measurement Equipment
ZFW	:	Zero Fuel Weight

INTRODUCTION

SYNOPSIS

Until the issuance of this preliminary report, investigation has not utilized the Digital Voice and Data Recorder (DVDR) data, therefore the communication information in this report are based on Air Traffic Control (ATC) transcript and pilot statement during interview.

On 21 December 2015, an Embraer 195-200 aircraft, registered PK-KDC was being operated by Kalstar Aviation on a scheduled passenger flight from H. Hasan Aroeboesman Airport (WATE) Ende to El Tari Airport (WATT) Kupang with flight number KD676.

The aircraft departed at 0916 UTC, on board of this flight were two pilots, three flight attendants, and 125 passengers. The pilot in command (PIC) acted as pilot monitoring (PM) and the Second in command (SIC) acted as pilot flying (PF).

There was no approach briefing performed by the PF, the discussion was that they were going to make RNAV approach runway 07, and landing configuration with flap 5 and auto-brake low.

At 0941 UTC the El Tari Tower controller informed that the visibility on runway 07 was four kilometers and issued clearance for RNAV approach runway 07 and requested the pilot to report when the runway insight.

At 0943 UTC the pilot reported that runway insight when passing 2500 feet and the tower controller inform that the wind was calm and clear to land.

The PF noticed that all Precision Approach Path Indicator (PAPI) lights indicated white color and the aircraft was too high for approach. Recognizing that the aircraft was too high, the PIC suggested non-standard configuration setting by extended landing gear down first with intention to increase drag. The landing gear was extended at approximately at 7 Nm from the threshold runway 07 and afterward selected flap to 1 and 2.

The SIC noticed that the aural warning system “HIGH SPEED...HIGH SPEED” when the aircraft speed was about 200 knots. On short final the SIC noticed also notice the Enhanced Ground Proximity Warning System (EGPWS) “TERRAIN AHEAD...PULL UP”

The PF noticed that the aircraft speed when crossing the runway threshold was approximately 180 knots. The aircraft touched down at approximately on the middle of the runway. After touchdown the PF immediately applied thrust reverser and manual braking. Realizing that the aircraft was about to overrun and the approach light on the end of the runway, the PIC decided to turn the aircraft to the right.

The aircraft overrun and stopped at approximately 200 meters from the end of runway 07.

At 0946 UTC the El Tari Tower controller saw the aircraft overrun, then pushed the crash bell and contacted the pilot arriving to Kupang to hold over SEMAU.

No one injured on this accident.

The investigation is continuing and will include the relevant information.

In this preliminary report Komite Nasional Keselamatan Transportasi issued several recommendations to the aircraft operator, ATS provider and Directorate General of Civil Aviation to address the safety issues identified in this investigation.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 21 December 2015, an Embraer 195-200 aircraft, registered PK-KDC was being operated by Kalstar Aviation on a scheduled passenger flight. The crew was scheduled for three sectors from Ngurah Rai Airport (WADD) – H. Hasan Aroeboesman Airport (WATE) Ende – El Tari Airport (WATT) Kupang¹ – Sultan Hasanuddin Airport (WAAA), Makassar.

The aircraft departed Ngurah Rai Airport at 0734 UTC which was delay for 74 minutes from the normal schedule due to late arrival from previous flight. The aircraft landed in H. Hasan Aroeboesman Airport, Ende at 0839 UTC. The airport operating hour was extended to 0915 UTC to accommodate the delay of the flight.

During transit the pilot in command received message from flight operation officer in Kupang which informed that the visibility at Kupang was one kilometer. The visibility according to weather forecast stated in the Terminal Aerodrome Forecast (TAFOR) that the visibility at Kupang would increase. The PIC decided to depart with consideration of weather forecast and operating hours of H. Hasan Aroeboesman Airport Ende.

The aircraft departed at 0916 UTC with flight number KD676. On board of this flight were two pilots, three flight attendants, and 125 passengers. The pilot in command (PIC) acted as pilot monitoring (PM) and the Second in command (SIC) acted as pilot flying (PF). There was no departure briefing performed by the PF. After takeoff, the pilot set the Flight Management System (FMS) to a point at 25 Nm from KPG VOR² and climbed to flight level (FL) 175 (17,500 feet). During climbing the PIC instructed to reduce the aircraft speed by 20 knots with intention to wait the weather improvement at Kupang.

During cruising the pilot monitored communication of El Tari Tower controller with another flight which informed that the visibility at Kupang was 2 km while the minima for approach was 3.9 km.

At 0927 UTC, the pilot established communication with El Tari Tower controller and requested for direct to point SEMAU which located 15 Nm west of KPG VOR, the approach chart required at SEMAU the altitude should be 5,100 feet.

There was no approach briefing performed by the PF, the discussion was that they were going to make RNAV approach runway 07, and landing configuration with flap 5 and auto-brake low³.

At 0932 UTC, the aircraft was on 62 Nm, the aircraft started to descend which was approved to descend to 10,000 feet. When the aircraft passed FL 150 the pilot requested to turn left to direct inbound track of VOR/DME approach runway 07 in

¹ El Tari Airport Kupang will be named as Kupang for the purpose of this report.

² VOR is a Very High Frequency Omnidirectional Range.

³ Flap 5 is a setting for 20 degrees flap extension. The autobrake has four setting: low, medium, and high (for landing) and RTO (rejected takeoff) for take off.

order to avoid cloud formation which indicated by magenta color on the aircraft weather radar.

At 0938 UTC, the pilot reported that the aircraft passing 9,500 feet.

At 0940 UTC, the pilot reported that the aircraft was crossing radial 288 and 21 Nm from KPG VOR.

At 0941 UTC, the El Tari Tower controller informed that the visibility on runway 07 was four kilometers and issued clearance for RNAV approach runway 07 and requested the pilot to report when the runway insight.

At 0943 UTC, the pilot reported that runway insight when passing 2,500 feet and the tower controller inform that the wind was calm and clear to land. The PF noticed that all Precision Approach Path Indicator (PAPI) lights indicated white color.

During the approach the autopilot and auto-throttle had been disengaged. The PF noticed that the aircraft was too high for approach and intended to reduce the descend speed to 210, however, the PIC suggested to maintain speed at 230 knots.

Recognizing that the aircraft was too high, the crew performed non-standard landing configuration setting by extended landing gear down first with intention to increase drag. The approach procedure stated that the sequence for establishing landing configuration is by selecting flap 1, flap 2, landing gear down, flap 3 and flap 5. The PF stated that the landing gear was extended at approximately at 7 Nm from the threshold runway 07 and afterward selected flap to 1 and 2.

The crew noticed the aural warning system “HIGH SPEED...HIGH SPEED”. The SIC also noticed that the aircraft speed was about 200 knots.

On short final the SIC noticed that the aircraft was on correct glide path and the speed was approximately at 180 knots. The PF also notice the Enhanced Ground Proximity Warning System (EGPWS) “TERRAIN AHEAD...PULL UP”

The PF stated that the aircraft speed when crossing the runway threshold was approximately 180 knots. The aircraft touched down at approximately on the middle of the runway. After touchdown the PF immediately applied thrust reverser and manual braking.

Realizing that the aircraft was about to overrun and the approach light on the end of the runway, the PIC decided to turn the aircraft to the right.

The aircraft stopped at approximately 200 meters from the end of runway 07.

At 0946 UTC the El Tari Tower controller saw the aircraft overrun, then pushed the crash bell and contacted the pilot arriving to Kupang to hold over SEMAU.

No one injured on this accident.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

The aircraft stopped approximately 200 meters from the end of runway 07 with heading 060°. The relative angle of the aircraft and the ground was approximately 7° and the nose wheel lifted about 50 centimeters from ground. The wings were oblique about 4° to the right.

The aircraft was substantially damaged. The details of the damage were as follows:

- Both nose wheels were minor damage. There were reverted rubber marks on both nose wheels.
- There was no significant damage on the left wing. Left engine inlet cowl had some nick damage. All of the fan blades leading edge of left engine was damage.
- There were minor damages on the main wheel 1 and 2.
- The right wing had severe damage with the details:
 - The navigation light was broken,
 - The inner flap was damage,
 - The inboard slat was detached from its mounting,
 - The wing leading edge behind the detached slat was plastic damage of “U” shape with diameter about 80 cm and about 40 cm depth.



Figure 1: The damaged right wing

- The right main landing gear collapsed caused by the trunnions detached from its attachments. The main wheel position number 3 and 4 collided with the right inner flap.
- The right engine struck to the ground, the lower engine cowl significantly damage and the inlet cowl had a minor nick damage. Most of the fan blades were damage on the leading edge. The thrust reverser door opened. The reverser cowls were detached found about 30 meters behind the aircraft final position.
- The supporting beam of the right inner wing rib broken.
- The main wheel position number 3 and 4 had severe damage and there were marks of reverted rubber.

1.4 Other Damage

There was a broken runway light at the end of runway 07.



Figure 2: The broken runway light

1.5 Personnel Information

1.5.1 Pilot in Command

Gender	: Male
Age	: 46 years
Nationality	: Indonesian
Marital status	: Married
Date of joining company	: February 2014
License	: ATPL
Date of issue	: 27 June 1996
Aircraft type rating	: Boeing 737-300/400/500; Embraer 190/195
Instrument rating validity	: 30 June 2016
Medical certificate	: First Class
Last of medical	: 31 July 2015
Validity	: 31 January 2016
Medical limitation	: Holder shall possess glasses that correct for near vision
Last line check	: 15 January 2015
Last proficiency check	: 13 December 2015
Flying experience	
Total hours	: 9,800 hours

Total on type : 598 hours
Last 90 days : 130 hours
Last 60 days : 80 hours
Last 24 hours : 1 hour 55 minutes
This flight : 40 minutes

1.5.2 Second in Command

Gender : Male
Age : 26 years
Nationality : Indonesian
Marital status : Single
Date of joining company : 1 July 2011
License : ATPL
 Date of issue : 31 October 2014
 Aircraft type rating : ATR-42/72; Embraer 190/195
Instrument rating validity : 31 December 2016
Medical certificate : First class
 Last of medical : 22 June 2015
 Validity : 22 December 2016
 Medical limitation : None
Last line check : 31 March 2015
Last proficiency check : 13 December 2015

Flying experience

Total hours : 2,997 hours
Total on type : 557 hours 25 minutes
Last 90 days : 117 hours 20 minutes
Last 60 days : 62 hours 15 minutes
Last 24 hours : 1 hour 55 minutes
This flight : 40 minutes

1.5.3 Flight Attendants

Flight attendants in this flight held valid licenses, rating and medical certificates.

1.6 Aircraft Information

1.6.1 General

Registration Mark : PK-KDC
Manufacturer : Embraer S.A
Country of Manufacturer : Brazil
Type/Model : 190-200 LR
Serial Number : 19000057
Year of Manufacture : 2006
Certificate of Airworthiness
 Issued : 20 May 2015
 Validity : 19 May 2016
 Category : Transport
 Limitations : None
Certificate of Registration
 Number : 3633
 Issued : 20 May 2015
 Validity : 19 May 2016
Time Since New : 16,862 hours 21 minutes
Cycles Since New : 14,765 cycles
Last Major Check : 12 February 2015 (4C)
Last Minor Check : -

1.6.2 Engines

Manufacturer : GE Engine Service
Type/Model : CF10-34E7
Serial Number-1 engine : 994239
 ▪ Time Since New : 15,314 hours 24 minutes
 ▪ Cycles Since New : 13,831 cycles
Serial Number-2 engine : 994240
 ▪ Time Since New : 15,291 hours 24 minutes
 ▪ Cycles Since New : 13,565 cycles

1.6.3 Weight and Balance

The weight and balance sheet issued by the Flight Operation Officer at Ende prior to dispatch contained the following data:

- Zero Fuel Weight 38,241 kg (maximum 42,500 kg)
- Fuel on board 5,900 kg
- Take off weight 44,141 kg (maximum: 44,242 kg)
- Burn fuel 1,718 kg
- Estimated Landing Weight 42,423 kg (maximum: 45,000 kg)

The weight and balance sheet showed that the total baggage on board was 650 kg with the distribution of 450 kg in compartment 1 and 200 kg in compartment 2.

The take off Centre of Gravity (CG) was 19.8% of the mean Aerodynamic Chord (MAC) and the CG of the Zero Fuel Weight (ZFW) was 22.5% of the MAC. The stab trim was 0.14 forward. The weight and balance sheet indicating that the aircraft was operated within the approved weight and balance envelope.

1.7 Meteorological Information

Meteorological report was provided by BMKG (*Badan Meteorologi, Klimatologi dan Geofisika* – Meteorology, Climatology and Geophysical Agency) Station, Kupang. The weather observation conducted by the Meteorology Station was supported by Automatic Weather Observation System (AWOS). The Meteorology Station issued meteorology report at 30 minutes interval through Automatic Terminal Information Service (ATIS) or if there were any significant changes.

1.7.1 Automatic Terminal Information Service (ATIS)

The meteorological reports issued by El Tari Meteorology Station on 21 December 2015 through ATIS on frequency 127.55 were as follows:

	0900 UTC	0911 UTC	0930 UTC	1000 UTC
Wind	210° / 22 knots Max 24 knots	220° / 12 knots	240° / 9 knots	Calm
Visibility	500 m	500 m	1 km	2 km
Weather	Rain	Thunder Storm Rain	Thunder Storm Rain	Rain
Cloud ⁴	Few CB 1,400 ft Broken 1,300 ft	Few CB 1,400 ft Broken 1,300 ft	Few CB 1,400 ft Broken 1,300 ft	Few CB 1,400 ft Broken 1,300 ft
TT/TD	24°C / 23°C	24°C / 22°C	24°C / 22°C	24°C / 23°C
QNH	1,011 mb / 29.87 in Hg	1,011 mb / 29.87 in Hg	1,012 mb / 29.88 in Hg	1,012 mb / 29.89 in Hg

⁴ 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 Broken (BKN) is when the clouds cover more than half (5/8 up to 7/8) area of the sky.

	0900 UTC	0911 UTC	0930 UTC	1000 UTC
QFE	999 mb / 29.51 in Hg	999 mb / 29.51 in Hg	999 mb / 29.52 in Hg	999 mb / 29.53 in Hg
Remarks	CB over the field	CB over the field	CB over the field	CB over the field

1.7.2 Automated Weather Observation System (AWOS)

Kupang Meteorological Station utilized Automated Weather Observation System (AWOS) with three different displays from three different sensor locations. The first sensor located at touchdown area runway 07 – approximately 130 meters on the left of runway 07 centerline and approximately 400 meters from beginning runway 07. The second sensor located at touchdown area runway 25 – approximately 98 meters on the right of runway 25 centerline and approximately 350 meters from beginning runway 25. The third sensor located near the tower building named MET Garden.

The AWOS information displayed in Meteorology Station office and also in El Tari Tower station. The display showed information according to its sensor location, which were labeled 07, 25 and M (figure 3).



Figure 3: The display of AWOS

1.7.3 Meteorological Information by Tower Set

On 1 December 2015, the AirNav Office District Kupang as a unit providing Air Traffic Services at Kupang installed a new tower set display to provide meteorological information. The display provides information of wind, temperature, dew point, QNH and QFE.



Figure 4: AWOS display (left) and Tower Set display (right)

1.7.4 Visibility Chart

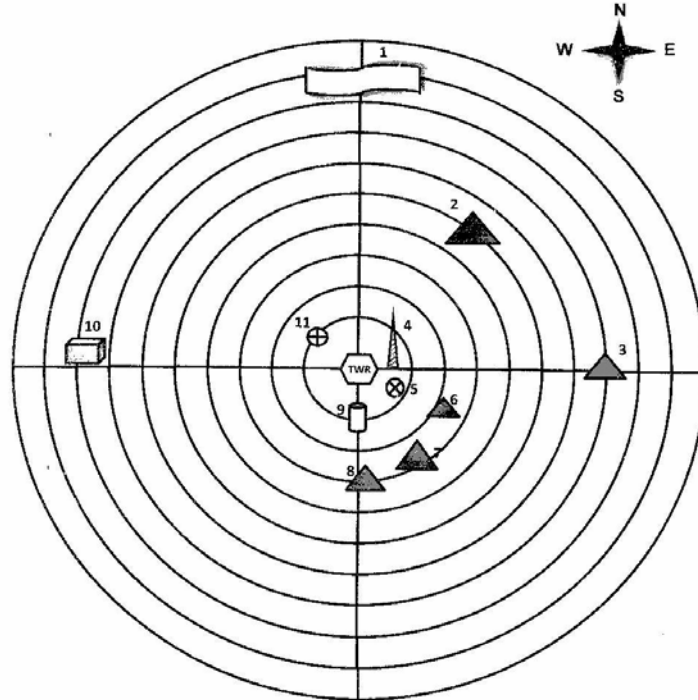
In order to provide the visibility information the Air Traffic Controller (ATC) on duty used the information from AWOS display and also from visibility chart that was provided in tower.

Based on interview of the ATC on duty, the visibility chart is used to compare the information on the AWOS display with the actual condition from ATC observation from Tower.

There were several landmarks that used as reference point to determine the visibility. The landmarks were selected to provide visibility information. The investigation could not find the standard operating procedure that describes the usage the visibility chart.

VISIBILITY CHART

From Tower Radius 10 KM



REMARK :

NO.	OBSTRUCTION	BEARING	DISTANCE	HEIGHT
1	Teluk Kupang	000°	9 KM	-
2	Bukit (North East)	040°	5 KM	700 Feet
3	Bukit (East)	090°	7 KM	1800 Feet
4	"OK" NDB	076°	352 M	100 Feet
5	DVOR / ASII (South East)	135°	982 M	180 Feet
6	Bukit (South East)	135°	3 KM	1200 Feet
7	Bukit (South South East)	170°	4 KM	1805 Feet
8	Bukit (South)	190°	3 KM	1640 Feet
9	Tower Lama (Lanud)	217°	1,390 KM	50 Feet
10	Gedung Keuangan Negara	275°	8 KM	100 Feet
11	VOR / DME (Raytheon/(u/s))	287°	1 KM	200 Feet

Figure 5: Visibility chart

1.7.5 Determination of Wind Information

There were three different sources that provided the latest wind information to ATC – AWOS display, Tower Set display and wind sock. Based on interview, the ATC stated that they used the information from AWOS display of runway 07 and windsock near tower building as comparison before providing the latest wind condition to the pilot of the accident flight.

The investigation could not find the standard operating procedure that described how to determine the wind information with three different sources.

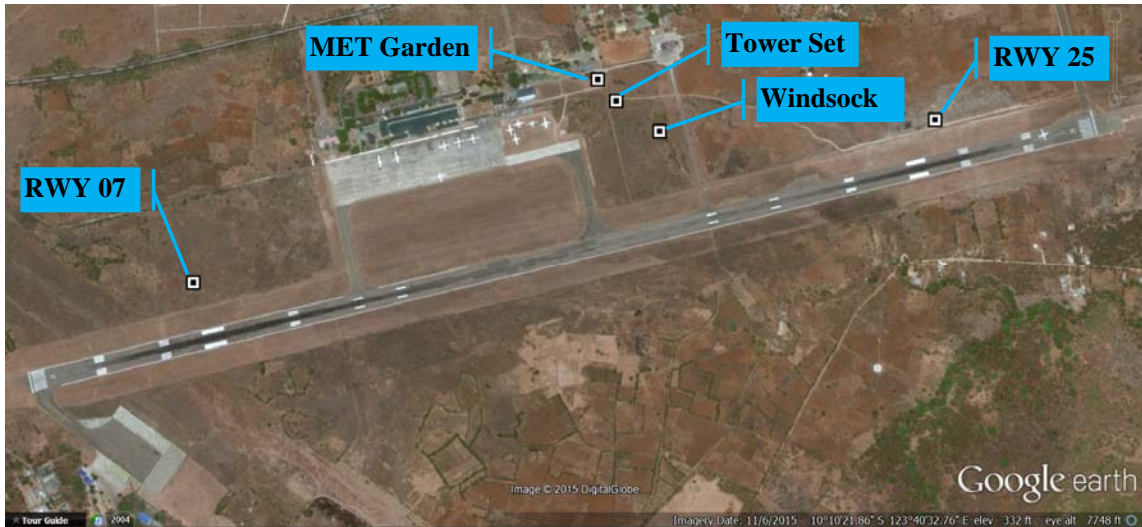


Figure 6: Meteorological sensor and windsock locations

1.8 Aids to Navigation

Runway 07 Kupang equipped with Global Navigation Satellite System (GNSS) that can be used for RNAV Approach since 25 August 2012. The detail of RNAV Approach can be seen figure 7.

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

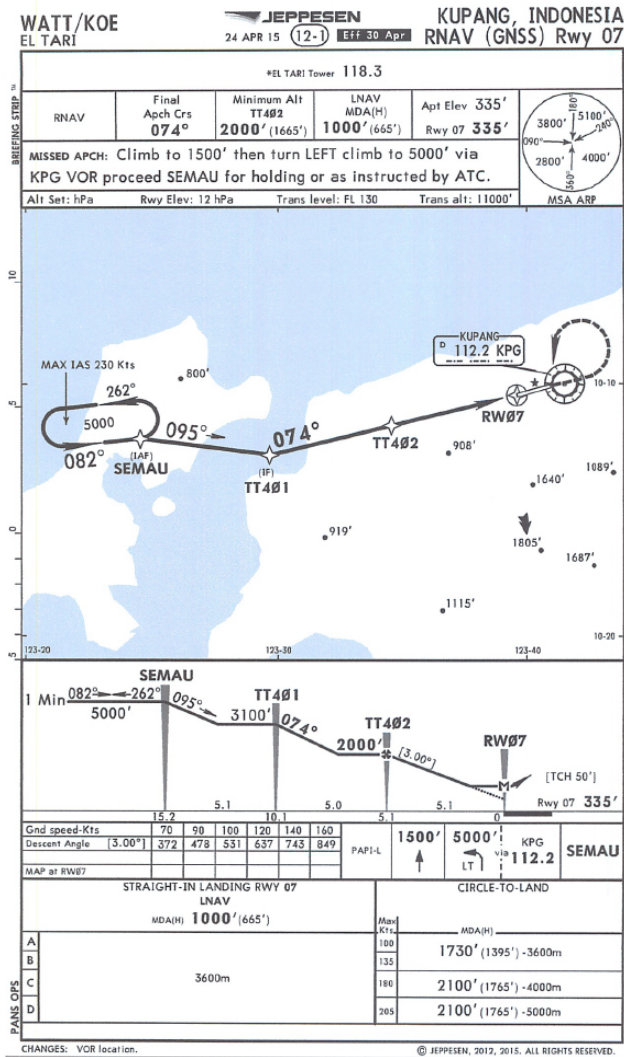


Figure 7: RNAV approach runway 07 chart published by Jeppesen

1.9 Communications

All communications between ATS and the crew were recorded by ground based automatic voice recording equipment and the Digital Voice and Data Recorder (DVDR). The quality of the transmission was good.

1.10 Aerodrome Information

Airport Name : El Tari Kupang
 Airport Identification : WATT
 Airport Operator : PT. Angkasa Pura I
 Airport Certificate : 020/SBU-DBU/VII/2010

Validity : 30 July 2015
Coordinate : 10°10'40"S and 123°39'50"E
Elevation : 335 ft
Runway Direction : 07 and 25 (azimuth 073° and 253°)
Runway Length : 2,500 m
Runway Width : 45 m
Surface : Asphalt

1.11 Flight Recorders

The aircraft equipped with two DVDRs (Digital Voice and Data Recorder). Each DVDR recorded the information of Cockpit Voice and Flight Data. One DVDR located at the aft side of the cabin and the other located on the electronic equipment bay.

Manufacturer : Honeywell
Part Number : 980-6025-001
Serial Number : DVDR 00660 (aft position)
DVDR 00665 (forward position)

Both DVDRs were transported to KNKT recorder facility in Jakarta for data downloading purposes.

The DVDR data have been successfully downloaded and contain 25 hours of 900 flight data parameters and two hours of cockpit voice recording which include the accident flight.

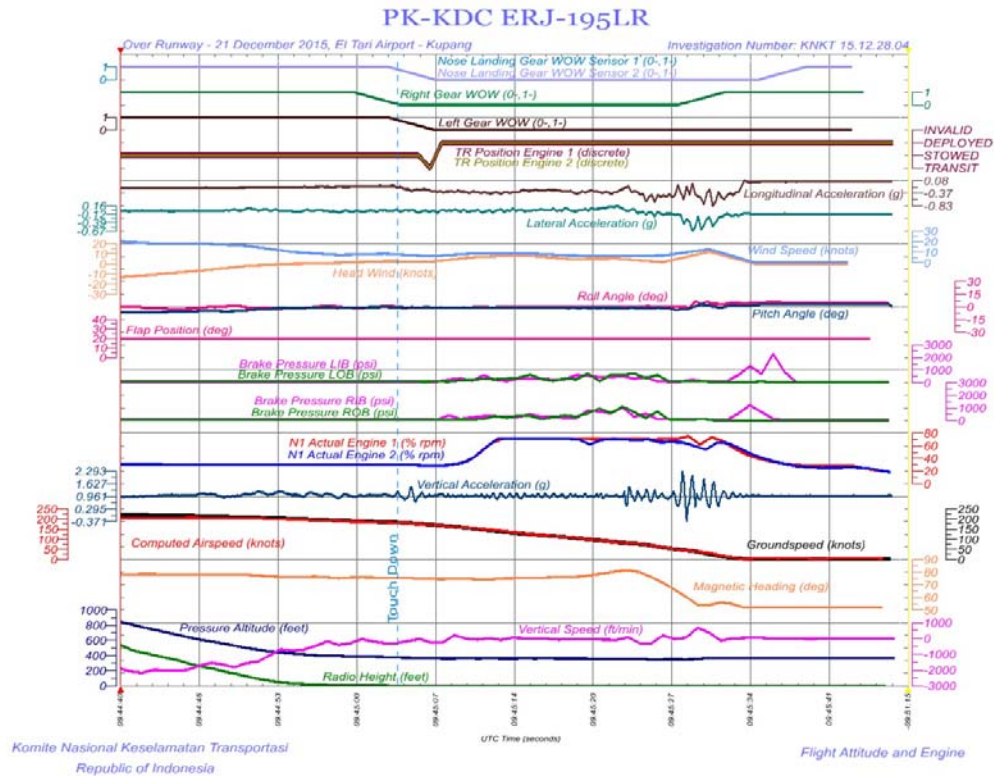


Figure 8: The graph of several flight data parameters

1.12 Wreckage and Impact Information

The investigation found tire marks on the runway indicated that aircraft started to veer to the right approximately 220 meters before end of runway 07. At the end of runway 07, there was a broken runway light (most likely struck by the aircraft).



Figure 9: Illustration of accident

About 100 meters from the end of runway 07, there was a ground indentation about 20 centimeters depth. The right main wheel marks ended before this indentation and changed to the marks of engine cowling.

The aircraft stopped approximately 200 meters from the end of runway 07 with heading 060° and the nose wheel lifted about 50 centimeters from ground.



Figure 10: the aircraft final position

All the landing gears were extended except for the right main landing gear which was found collapsed and collided with the right inner flap.



Figure 11: The flap selector observed at aircraft final position

The all flaps were extended. All engine reverser were opened and the right engine reverser doors detached and found about 35 meters behind the aircraft.

Approximately 185 meters from end of runway 07, found a collapsed palm tree. The dimension of the tree was approximately 40 cm in diameter with 5 m height. It is most likely that the right wing hit this tree and made a plastic deformation on the leading edge of right wing with dimension approximately 80 cm in width and 40 cm in depth.

The ground surface condition after RESA was down slope about 4° – 5°.

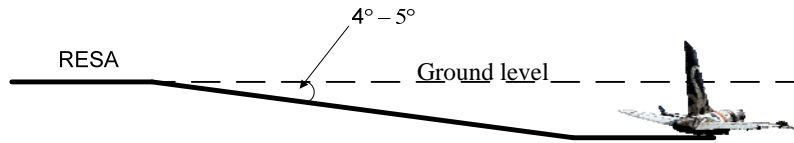


Figure 12: The illustration of ground surface

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were they required.

1.14 Fire

There was no evidence of pre or post impact fire.

1.15 Survival Aspects

At 0946 UTC, the El Tari Tower controller noticed that the aircraft overrun and pushed the crash bell to inform the Aircraft Rescue and Fire Fighting (ARFF) personnel. The controller then called the ARFF personnel and informed that there was aircraft overrun from runway 07 on sector C13 of grid map (figure 13). The ARFF then deployed three vehicles.



Figure 13: The aircraft location on grid map

At 0945 UTC, the ARFF personnel arrived in the accident site followed by Search and Rescue personnel and there was no indication of fire on the aircraft.

After the aircraft stopped, the PIC commanded “attention crew on station⁵” through Passenger Announcement (PA) system. The Flight Attendant 1 (FA1) then checked inside and outside condition through a small window of forward left passenger door (L1) because the window of forward right passenger door (1R) was covered by mud. There was no fall over luggage and all passengers remained on their seat. The FA 1 did not see any indication of fire on the left side of the aircraft.

The FA1 disarmed the slide then opened the L1 door to reconfirm the outside condition. When the door opened the FA 1 saw the ARFF personnel surround the aircraft. The FA1 asked the ARFF personnel whether any stair for passenger disembarkation and the ARFF personnel suggested using evacuation slide because the ground condition was muddy.

The PIC then commanded “control disembarkation⁶ only forward doors left side”. The FA1 informed to the PIC about the outside condition that was muddy and required escape slide to disembark the passengers. The FA1 then relayed the instruction to the other flight attendant through PA system to perform control disembarkation using only left forward doors (L1). The FA1 armed the slide bar then opened the L1 door. The escape slide inflated and the SIC was the first person disembarked the aircraft through the escape slide in order to assist the evacuation process from the outside.

After about a quarter of the total passenger disembarked, the PIC instructed the FA1 to open aft left passenger door (L3). The FA1 then relayed the instruction to the other flight attendants (FA2 and FA3) using megaphone as the PA was not working due to no electrical power. The L3 door was opened by FA2 and then the passengers were directed to evacuate through this door.

At 1000 UTC, bus and ambulance arrived to the accident site to transport the passengers to the terminal building.

After about 20 minutes, all occupants were completely evacuated. The ARFF personnel then conducted runway inspection and there was no debris leftover on the runway.

1.16 Tests and Research

This section will be included in the final report.

5 Attention crew on station is a command that means instruction to the flight attendants to check the condition outside the aircraft in preparation for an evacuation.

6 Control disembarkation is a condition where passengers should leave the aircraft as a precautionary measure.

1.17 Organizational and Management Information

1.17.1 Aircraft Owner and Operator

Aircraft Owner : Aldus Portfolio B Limited

Address : Suite 4440, Atlantic Avenue, West Park
Business Campus, Shannon, Co. Clare, Ireland

Aircraft Operator : PT. KalStar Aviation

Address : Villa Melati Mas, Blok SR I, No. 14,
Bumi Serpong Damai, Tangerang, Indonesia

Operator Certificate Number : 121-037

1.17.2 Air Traffic Services Provider

The Air Traffic Services (ATS) within Indonesian airspace are provided by *Perum Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia/LPPNPI* (AirNav Indonesia).

Kupang airspace is included in the Makassar Flight Information Region (FIR) and the ATS provider units on Kupang are Flight Service Station (FSS) and Aerodrome Control Tower (ADC).

1.18 Additional Information

The investigation is continuing and will include details of the following:

- Flight data and voice recorded information,
- Crew training,
- Aircraft system and information,
- Crew manual,
- Organization information,
- Human factors.

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

According to factual information collected until the issuance of this Preliminary Report, the Komite Nasional Keselamatan Transportasi (KNKT) identify the findings of the investigation are listed as follows:

1. The aircraft was airworthy prior to the occurrence and was operated within the weight and balance envelope.
2. All crew held valid licenses and medical certificates.
3. The accident flight the second sector of three scheduled sector.
4. The aircraft departure from Ngurah Rai Airport was delay for 74 minutes from the normal schedule.
5. During transit, the pilot received information that the visibility at Kupang was one kilometre and the forecast stated that the visibility would increase.
6. The PIC decided to depart with consideration of weather forecast and operating hours of H. Hasan Aroeboesman Airport Ende.
7. The SIC acted as pilot flying and the PIC acted as pilot monitoring.
8. There was no departure and approach crew briefing performed by the flight crew.
9. The approach was intended to follow the RNAV approach runway 07 which was approved by ATC and configuration landing with flap 5 and auto-brake low.
10. The landing configuration setting was performed with non-standard sequence by extending the landing gear down first with intention to increase drag.
11. The SIC noticed that the aural warning “HIGH SPEED...HIGH SPEED” active when the aircraft speed at about 200 knots.
12. On short final the SIC noticed that the aircraft was on correct glide path and the speed was approximately at 180 knots. The PF also notice activation of the EGPWS aural warning of “TERRAIN AHEAD...PULL UP”
13. The PF noticed that when crossing the runway threshold the aircraft speed was approximately 180 knots. The aircraft touched down at approximately on the middle of the runway.
14. The aircraft stopped at approximately 200 meters from the end of runway 07.
15. The investigation could not find the standard operating procedure that describes the usage the visibility chart for the ATC.
16. The investigation could not find the standard operating procedure that described how to determine the wind information with three different sources available for the ATC.

3 SAFETY ACTION

At the time of issuing this preliminary report, the KNKT has been informed several safety actions taken by the air operator resulting from this occurrence. The safety actions were as follows:

1. Issued a Safety Notice No. 030/KSA-CASO/XII/2015 on 23 December 2015 which emphasized several aspects for pilot as follows:
 - Restriction for takeoff and landing either visual or instrument flight rules if weather below minima.
 - Re-emphasized stabilized approach criteria.
 - Recommendation for go-around in case of un-stabilized approach.
 - Re-emphasized crew coordination and communication.
 - Taking over control consideration.
2. Enforced of ALAR-CFIT training for all the pilots (recurrent ALAR-CFIT training).
3. CRM reinforcement of commandership and human factor (recurrent CRM training).
4. Issued Notice to flight attendant No. 028/NOFA/XII/2015 on 22 December 2015 which emphasized flight attendant briefing and review emergency evacuation procedure.
5. Consistently conduct Line Check/LOSA for all pilots.
6. Briefed all pilots regarding to the procedures, crew briefing for landing, cockpit silent flight below 10,000 feet and stabilized approach criteria.
7. Restructured the operation department with additional of Training Department.
8. Included the un-stabilized approach in the proficiency check syllabus.

4 SAFETY RECOMMENDATIONS

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

The Directorate General of Civil Aviation is responsible for the implementation of these recommendations addressed to the relevant parties.

4.1 PT. KalStar Aviation

- **04.O-2016-16.1**

To ensure the flight crew to perform appropriate crew briefing.

- **04.O-2016-17.1**

To emphasize the flight crew to the stabilized approach criteria.

- **04.O-2016-18.1**

To emphasize the flight crew to response to the aircraft warning system and EGPWS warning appropriately.

4.2 AirNav District Office Kupang

- **04.A-2016-19.1**

To include in the Standard Operating Procedure (SOP) of ATC the procedure for utilizing of visibility chart and determination of the wind information.

5 APPENDICES

5.1 Safety Notice

	SAFETY NOTICE	STATUS	
		√	

Number : 030/KSA-CASO/XII/2015
Attention : All Pilot
Date : 23 Dec 2015
Subject : Runway excursion

Recently the unfavorable weather conditions at lately , urged to all crews Kalstar Aviation

1. Are not allowed takeoff and landing when the weather is below minimum limit either visual or instrument flight,
2. All flight crews must pay attention to stabilized approach criteria, in accordance with both visual and instrument flight,
3. In case of un-stabilized approach occurs or other conditions that are considered dangerous to landing, **GO-AROUND** procedure must be executed,
4. Crew coordination and communication must be applied all phase of flight (CRM),
5. Each pilot has the right to take over the control plane if the PF do things that are not appropriate safety procedures
6. All pilots have to avoid bad weather (Avoid bad weather),
7. In case of entering bad weather must perform procedure of turbulence speed penetration and reduces maneuvers.

and have save flight.

Best regards

SAFETY DEPARTMENT

5.2 Notice to Flight Attendant

KALSTAR AVIATION	NOFA
----------------------------	-------------

Kepada Yth : All Flight Attendant
Dari : Chief Flight Attendant
Hal : Accident PK – KDC
Nomor : 028/NOFA/XII/2015
Tanggal : 22 Desember 2015

Dengan hormat,

Sehubungan dengan accident PK – KDC pada tanggal 21 Desember 2015, bersama ini disampaikan kepada seluruh FA on duty sebagai berikut:

1. Selalu melaksanakan Flight Attendant Briefing (refer to FAM Chapter 1.3.3)
2. Me-review kembali Emergency Procedure (refer to FAM Chapter 5)

Demikian disampaikan untuk dapat dilaksanakan. Atas perhatian dan kerjasamanya diucapkan terima kasih.

Salam,

Chief Flight Attendant

5.3 Proficiency check syllabus training



RECURRENT FFS SESSION 1

PILOT NAME	LICENSE NO.	DATE of CHECK	Training For				
			CAPT	F/O	R/H QUALIFIED		
Route : ZFW : FUEL : TOW : RSV :	Dawn / Day / Dusk / Night Flaps : MAC/Stab : C.I : Temp. Dev :	Wind : Vis : Present Wx : Temp / Dew : QNH :	<u>LOCATION :</u>				
TIME	EXERCISES	PF			PM		
		S	SB	U	S	SB	U
4 HOURS	Flight Preparation						
	Dark Cockpit Situation / Internal Safety Inspection						
	Power Up procedure						
	Normal Start						
	Taxi Out / Pack 2 Fail MEL						
	Take Off						
	Rejected Take Off (Repositioning)/Take Off Reset						
	Take Off – Climb to 10.000 ft , while climbing TCAS performed						
	Reaching Cruise Level, Steep Turn and Clean Stall						
	DC BUS 1 Off						
	Radar Vector Back to Airport						
	ILS Approach						
	Abnormal Approach and Landing						
	Take Off Reset						
	Climb to 10.000 ft						
	Windshear, continue Windshear recovery						
	Reaching Altitude, Rudder Fail						
	Radar Vector Back to Airport						
VOR Approach, Unstabilize approach							
Go Around, Continue Visual Approach							
Full stop Landing							
<i>Comments :</i>							
<input type="checkbox"/> U : Unsatisfactory <input type="checkbox"/> S : Satisfactory							
PF HOURS :	PM HOURS :	TOTAL :	Accuracy :				
			- Altitude : ± 100 feet				
			- Speed : ± 10 kts				
			- Heading : ± 10 degree				
Trainee Name and Signature				Instructor Name and Signature			
(.....)				(.....)			
				LOA No. :			