



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

FINAL

KNKT.17.08.25.04

Aircraft Accident Investigation Report

**PT. Lion Mentari Airlines PT. Wings Abadi Airlines
Boeing 737-900ER; PK-LJZ and ATR 72-500; PK-WFF**

Kualanamu International Airport, Medan

Republic of Indonesia

3 August 2017



2018

This Final Report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

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

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Jakarta, April 2018

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
Chairman**



SOERJANTO TIAHJONO

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ABBREVIATIONS AND DEFINITIONS

AC	:	Advisory Circular
AOC	:	Airline Operator Certificate
ATC	:	Air Traffic Control
ATIS	:	Automatic Terminal Information Service
ATPL	:	Airline Transport Pilot License
ATS	:	Air Traffic Services
AWOS	:	Automatic Weather Observation System
BMKG	:	<i>Badan Meteorologi Klimatologi Geofisika</i> / Meteorological Climatological and Geophysics Agency
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
cm	:	Centimeters
CVR	:	Cockpit Voice Recorder
DA	:	Decision Altitude
FA	:	Flight Attendant
FDR	:	Flight Data Recorder
FOD	:	Foreign Object Debris
ft	:	Feet
ICAO	:	International Civil Aviation Organization
KNKT	:	Komite Nasional Keselamatan Transportasi
LT	:	Local Time
m	:	Meters
NTSB	:	National Transport Safety Board
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
RET	:	Rapid Exit Taxiway
SIC	:	Second in Command
SOP	:	Standard Operation Procedures
UTC	:	Universal Coordinated Time

SYNOPSIS

The events described in the history of flight were produced using the available data collected during the investigation including Closed Circuit Television (CCTV) installed in the tower cab, Flight Data Recorder (FDR), Cockpit Voice Recorder (CVR) and personnel interviews.

On 3 August 2017, a Boeing 737-900 ER aircraft, operated by PT. Lion Mentari Airlines (Lion Air) as a scheduled passenger flight from Sultan Iskandar Muda International Airport, Banda Aceh (WITT) to Kualanamu International Airport, Medan (WIMM) as flight number JT 197. JT197 departed at 1010 LT (0310 UTC) in daylight condition, with 158 persons on board.

Meanwhile, an ATR 72-500 aircraft, operated by PT. Wings Abadi Airlines (Wings Air) as scheduled passenger flight from Medan with intended destination to Cut Nyak Dien Airport, Meulaboh (WITC) as flight number IW1252. On board IW1252 were two pilots, one observer pilot, two flight attendants and 67 passengers.

At 0356 UTC, the IW1252 pilot requested taxi clearance to runway 23 from the Medan Ground controller and was instructed to follow U2 taxi route, the IW1252 pilot requested to depart via intersection taxiway D which was approved by Medan Tower controller.

At 0357 UTC, JT197 was on landing approach and received landing clearance. At 04:00:01 UTC, the Medan Tower controller issued conditional clearance to the IW1252 pilot, to enter the runway after the JT197 had landed. This conditional clearance was combined with the air traffic control route clearance. IW1252 continued to taxi and entered the runway. At 04:00:50 UTC, JT197 touched down on runway 23 and a few second later impacted with the IW1252. There were no injuries during this occurrence, but both aircraft were substantially damaged.

After impact, debris from the impact aircraft remained on the runway. Prior to the runway inspection, one aircraft departed and one aircraft landed.

The investigation determined that aircraft serviceability was not issue in the accident and the analysis discusses IW1252 and JT197 movement, the air traffic controller attention, the conditional clearance and hazard identification on runway. The investigation concluded the contributing factor of the accident was:

The communication misunderstanding of the conditional clearance to enter runway while the IW1252 pilots did not aware of JT197 had received landing clearance and the unobserved IW1252 aircraft movement made the IW1252 aircraft entered the runway.

Following the investigation, the Komite Nasional Keselamatan Transportasi (KNKT) was informed that several safety actions taken by related parties. The KNKT acknowledges the safety actions taken by the AirNav Indonesia branch Medan, Wings Air and Lion Air, however there still remain safety issues that need to be considered. Therefore, the KNKT issues safety recommendations addressed to the AirNav Indonesia.

Investigation involved National Transport Safety Board (NTSB), United States of America and Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation (BEA), France that assigned accredited representative according to the ICAO Annex 13.

1 FACTUAL INFORMATION

1.1 History of the Flight

The information in the history of flight was produced using the available data collected during the investigation including Closed Circuit Television (CCTV) installed in the tower cab, Flight Data Recorder (FDR), Cockpit Voice Recorder (CVR) and personnel interview.

On 3 August 2017, a Boeing 737-900 ER aircraft operated by PT. Lion Mentari Airlines (Lion Air) as a scheduled passenger flight from Sultan Iskandar Muda International Airport, Banda Aceh (WITT) to Kualanamu International Airport, Medan (WIMM)¹ with flight number JT197.

At 1010 LT (0310 UTC²) in daylight condition, the JT197 departed Banda Aceh with 151 persons on board consisting of two pilots, five flight attendants and 144 passengers. The Pilot in Command (PIC) acted as Pilot Flying (PF) and the Second in Command (SIC) acted as Pilot Monitoring (PM). The flight was the second flight of the day for both pilots. There was no report or record of aircraft system abnormality prior to the departure until the time of occurrence. The flight from departure until commencement of the approach was uneventful.

Meanwhile, an ATR 72-500 aircraft operated by PT. Wings Abadi Airlines (Wings Air) as scheduled passenger flight from Medan with intended destination of Cut Nyak Dien Airport, Meulaboh (WITC) with flight number IW1252. On board IW1252 were two pilots, one observer pilot, two flight attendants and 67 passengers. The PIC acted as PF and the SIC acted as PM.

According to the filed flight plan, IW1252's scheduled departure was at 0345 UTC. Prior to departure there was problem with passenger baggage handling that delayed the departure.

At 0354 UTC, the Flight Attendant (FA) of IW1252 advised to the IW1252 pilot that the boarding process had completed. The IW1252 pilot then requested to Medan Ground controller for push back and engine start, which was approved.

At 0356 UTC, the IW1252 pilot requested taxi clearance to the Medan Ground controller and was instructed to taxi to runway 23 following U2 taxi route, which was from apron V to holding point runway 23 on taxiway C, via taxiway U – T – and B.

¹ Kualanamu International Airport, Medan (WIMM) will be named as Medan for the purpose of this report.

² 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.

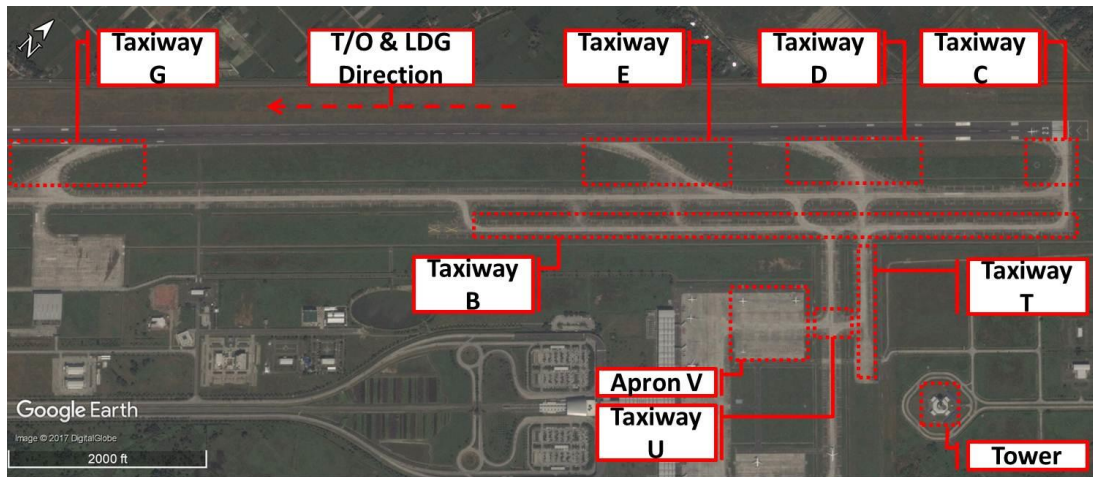


Figure 1: The Medan aerodrome layout

At 0357 UTC, the JT197 pilot reported to the Medan Tower controller that the aircraft has established on the localizer of Instrument Landing System (ILS) for runway 23. The Medan Tower controller acknowledged this and issued a landing clearance with additional information regarding the wind conditions and barometric pressure.

At 0358 UTC, the IW1252 pilot was instructed by Medan Ground controller to contact Medan Tower controller for further instruction. The IW1252 pilot contacted Medan Tower controller and was instructed to continue to taxi and hold on short of runway 23. The IW1252 pilot requested to depart via intersection taxiway D with intention to expedite the departure and this was approved by Medan Tower controller. Taxiway D was a Rapid Exit Taxiway (RET)³ for runway 05.

Afterward the control of Medan Tower handed over to another controller who was previously resting.

At 0359 UTC, the IW1252 pilot advised the Medan Tower controller that the aircraft was close to reaching runway 23. The Medan Tower controller requested confirmation that IW1252 was ready for immediate departure. There was no reply and the Medan Tower controller repeated the request and received the reply that the IW1252 was able for immediate departure.

The requested confirmation of immediate departure to the IW1252 pilot by the Medan Tower controller was intended to depart the IW1252 immediately after the JT197 landed, since there was another arriving aircraft behind JT197.

At 04:00:01 UTC, the Medan Tower issued clearance to IW1252 pilot: *“Wings Abadi ONE TWO FIVE TWO behind traffic Lion short final landed passing line up behind runway TWO THREE from intersection DELTA additional clearance after departure direct Meulaboh”*.

At 04:00:13 UTC, the IW1252 pilot readback: *“after departure direct to Meulaboh Wings Abadi ONE TWO FIVE TWO”*.

³ The Rapid Exit Taxiway (RET) is a taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

At 04:00:15 UTC, the Medan Tower controller acknowledged the IW1252 pilot readback by saying: “*Namu Tower*”. The Medan Tower controller assumed that the pilot had acknowledged the clearance properly and the immediate action to correct the discrepancies of the pilot readback was considered not necessary. Thereafter, IW1252 continued the taxi for line up runway 23.

At 04:00:18 UTC, another arriving aircraft advised the Medan Tower controller that the aircraft was established on the localizer ILS runway 23.

At 04:00:22 UTC, the Medan Tower controller checked the surface wind and QNH indicator on the tower desk, then instructed the other arriving aircraft pilot to continue the landing approach and advised the latest surface wind and QNH. The Medan Tower controller also advised the other arriving aircraft pilot, that there was an aircraft that would depart from runway 23.

At 04:00:32 UTC, IW1252 crossed the runway holding position marking (yellow line). At the same time, the Medan Tower controller was monitoring the distance of the other arriving aircraft to touchdown on the aircraft situational display (radar display) on the tower desk controller, and the distance was about 10 Nm.

At 04:00:46 UTC, the JT197 PM advised to the PF of the IW1252 position, which close to the runway, and repeated this again three seconds later. The JT197 pilots were aware that the clearance for the IW1252 pilot was to enter the runway after the JT197 landed, and assumed that the IW1252 aircraft would not enter the runway. Therefore, the JT197 PF decided to continue the landing approach and focused on handling the aircraft.

At 04:00:50 UTC, JT197 touched down and the attention of the Medan Tower controller changed back from the radar display to the runway environment.

At 04:00:52 UTC, IW1252 crossed the runway side stripe marking (white line) and continued to enter the runway. The JT197 PM advised to the PF that IW1252 was entering runway and this was acknowledged by the PF.

At 04:00:56 UTC, JT197 impacted with IW1252.

At 04:01:00 UTC, the JT197 pilot confirmed to the Medan Tower controller that there was another aircraft on the runway and this was acknowledged. The Medan Tower supervisor on duty noticed two aircraft on the runway and the Medan Tower controller panicked. Thereafter, the Medan Tower supervisor took over the communication of Medan Tower.

At 04:01:47 UTC, the JT197 pilot contacted the Medan Tower twice, and received a response at 04:02:01 UTC by the Medan Tower supervisor, who then instructed them to vacate the runway via taxiway G.

At 04:02:05 UTC, the JT197 pilot advised to the Medan Tower that the aircraft had touched down and asked why there was another aircraft on the runway 23. The Medan Tower supervisor requested the pilot to standby.

At 04:02:30 UTC, the Medan Tower supervisor instructed the other arriving aircraft pilot to make overshooting due to traffic. The other arriving aircraft pilot requested to make orbit to the left on final approach which was approved.

At 04:03:02 UTC, the IW1252 pilot contacted Medan Tower and was requested to standby. The Medan Tower supervisor then instructed the JT197 pilot to contact Medan Ground controller.

At 04:03:18 UTC, the JT197 pilot contacted the Medan Ground controller and was instructed to taxi to parking bay number 31.

At 04:03:20 UTC, the Medan Tower supervisor issued takeoff clearance to the IW1252 pilot, with additional clearance to turn left heading 315 after airborne. The IW1252 pilot responded that the IW1252 was unable to depart. The Medan Tower supervisor then instructed the IW1252 pilot to hold on the runway.

At 04:04:13 UTC, the Medan Tower supervisor instructed the other arriving aircraft pilot to climb to 4,000 feet and contact Medan Approach for further instruction.

At 04:04:28 UTC, the Medan Tower supervisor requested the Medan Approach controller for departure clearance for IW1252 and IW1252 was cleared to direct flight to Meulaboh.

At 04:04:40 UTC, the Medan Tower supervisor issued takeoff clearance to IW1252 pilot and the IW1252 pilot responded by requesting to return to apron for inspection of any damage to the aircraft. The Medan Tower supervisor approved the request and instructed the IW1252 pilot to vacate runway via taxiway E then to contact the Medan Ground controller.

At 04:05:21 UTC, another departure aircraft pilot advised Medan Tower that the aircraft was on taxiway C, and was holding on short runway 23. The Medan Tower supervisor instructed the other departure aircraft pilot to standby.

At 04:07:17 UTC, the IW1252 pilot contacted the Medan Ground controller and was instructed to taxi to parking bay number 2.

After coordinating with Medan Approach controller and received clearance for other departure aircraft, the Medan Tower supervisor instructed the other departure pilot to line up runway 23, and then issued takeoff clearance at 04:07:21 UTC. The other departure aircraft was airborne at 0408 UTC.

At 04:08:38 UTC, the other arriving pilot contacted the Medan Tower and received instruction to continue the landing approach.

At 04:08:55 UTC, the JT197 pilot advised the Medan Ground controller the possibility of aircraft debris on the runway that might become hazard to the other aircraft. The Medan Ground controller acknowledged and relayed the information to Medan Tower supervisor.

At 04:10:26 UTC, the other departure pilot advised to the Medan Tower that there was Foreign Object Debris (FOD) on the runway. The Medan Tower supervisor advised them to contact the Medan Approach controller.

At 04:10:44 UTC, the Medan Tower supervisor issued landing clearance to other arriving aircraft pilot and this was acknowledged.

At 04:10:51 UTC, the JT197 pilot re-advised the Medan Ground controller of the debris on the runway and was advised that the Airport Runway and Accessibility unit had been informed.

At 04:14:06 UTC, after landing on runway 23, the other arriving pilot advised the Medan Tower that there was FOD on the runway and this was acknowledged.

The IW1252 and JT197 parked at the assigned parking bays and the passengers disembarked normally.

At 04:31:11 UTC, the Medan Tower controller announced to all aircraft that due to FOD, the runway would be closed until 0440 UTC.

After all the debris were collected and runway cleaned, the runway was reopened and resumed to normal operation at 0455 UTC.

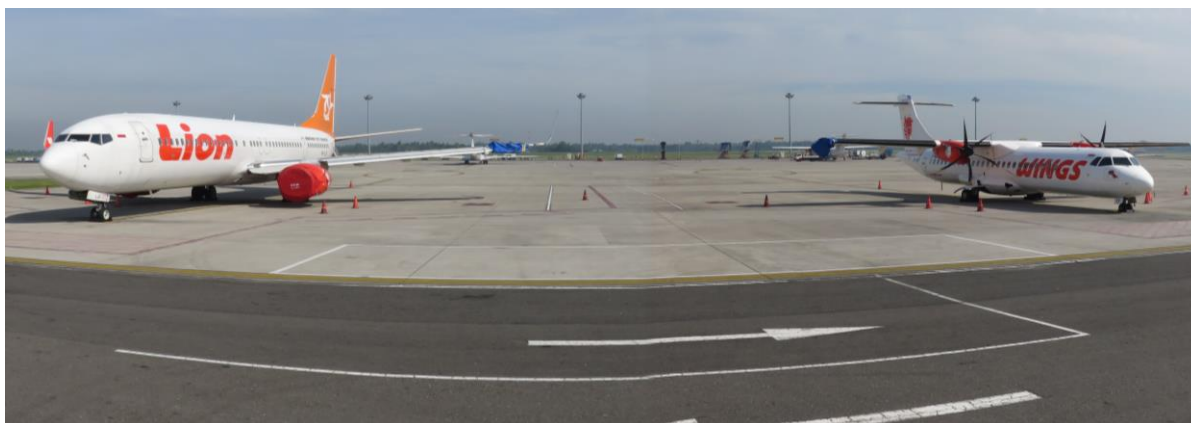


Figure 2: JT197 and IW1252 after the accident

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

Both aircraft were substantially damaged. The damage was found on the left wing of JT197 and the right wing of IW1252, as well as the nose section of IW1252.

1.4 Other Damage

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

1.5 Personnel Information

1.5.1 Pilot Information of JT197

	PIC	SIC
Age	45 years	23 years
Nationality	Indonesia	Indonesia
Marital status	Married	Single
Date of joining company	2 April 2014	10 March 2016
License	ATPL	CPL
Date of issue	2 February 2015	30 June 2015
Aircraft type rating	Boeing 737 NG	Boeing 737 NG
Instrument rating validity	28 February 2018	30 November 2017

	PIC	SIC
ICAO Language Proficiency	Level 4	Level 5
Validity	31 December 2017	1 August 2022
Medical certificate	First Class	First Class
Last of medical	27 February 2017	27 April 2017
Validity	31 August 2017	31 October 2017
Medical limitation	Shall wear lenses that correct for distant vision and possess glasses that correct for near vision.	None
Last line check	25 April 2017	10 April 2017
Last proficiency check	22 February 2017	24 November 2017
Flying experience		
Total hours	8,200 hours	500 hours
Total on type	2,296 hours	500 hours
Last 90 days	273 hours	229 hours
Last 60 days	173 hours	160 hours
Last 24 hours	11 hours 30 minutes	11 hours 30 minutes
This flight	1 hour 5 minutes	1 hour 5 minutes

1.5.2 Pilot Information of IW1252

	PIC	SIC
Age	59 years	23 years
Nationality	Indonesia	Indonesia
Date of joining company	4 April 2016	21 March 2016
License	ATPL	CPL
Date of issue	25 January 1996	8 September 2016
Aircraft type rating	ATR 72	ATR 72
Instrument rating validity	30 April 2018	31 December 2017
ICAO Language Proficiency	Level 4	Level 4
Validity	31 December 2019	31 December 2019
Medical certificate	First Class	First Class
Last of medical	26 January 2017	15 March 2017
Validity	31 January 2018	30 September 2017

Medical limitation	Shall wear lenses that correct for distant vision and possess glasses that correct for near vision.	None
Last line check	21 December 2016	08 June 2017
Last proficiency check	1 April 2017	1 December 2016
Flying experience		
Total hours	13,006 hours	263 hours 50 minutes
Total on type	624 hours	109 hours
Last 90 days	232 hours	76 hours 50 minutes
Last 60 days	172 hours	14 hours 25 minutes
Last 24 hours	2 hours	-
This flight	20 minutes	20 minutes

1.5.3 Air Traffic Controller

	Tower	Ground	Supervisor
Age	24 years	23 years	34 years
Nationality	Indonesia	Indonesia	Indonesia
Year of joining company	2017	2016	2014
License	Air Traffic Control License	Air Traffic Control License	Air Traffic Control License
Date of issue	21 December 2015	21 December 2015	1 July 2015
Rating	Aerodrome Control	Aerodrome Control	<ul style="list-style-type: none"> • Aerodrome Control • Approach Control • Surveillance
Validity	September 2017	December 2017	December 2017
Medical certificate	Third Class	Third Class	Third Class
Last of medical	6 June 2017	6 June 2017	5 June 2017
Validity	6 June 2018	6 June 2018	5 June 2018
Medical limitation	None	None	None
ICAO Language Proficiency	Level 4	Level 4	Level 4
Validity	20 November 2018	20 November 2018	12 August 2019

	Tower	Ground	Supervisor
Working time⁴			
Last 7 days	33 hours	27 hours	27 hours
Last 24 hours	3 hours	3 hours	3 hours
Duty time⁵			
Last 7 days	10 hours 2 minutes	8 hours 2 minutes	10 hours
Last 24 hours	2 minutes	2 minutes	None

The Medan Tower Personnel Experience

The Medan Tower controller received simulator training to handle an unusual aircraft operation whilst studying to become an air traffic controller in the aviation college in 2015, while the Medan Tower supervisor received similar in 2005. The occurrence was the first time the Medan Tower controller and supervisor handled an unusual aircraft operation in real life.

The Medan Tower controller on duty had been trained in the requirement to use the conditional clearance during the air traffic controller course in the aviation college in 2015. The investigation could not find documentation that indicated the conditional clearance requirement had been rehearsed to the Medan air traffic controllers.

The conditional clearance that involved departing and arriving aircraft without confirmation whether the departing aircraft pilot had correctly identified the arriving aircraft was often used by the Medan Tower controller. The Medan Tower controller did not recall any pilot previous misunderstanding while issuing conditional clearances.

The Medan Tower controller and supervisor conducted a performance check on May 2017, to maintain the aerodrome control rating. During the performance check, there was no discussion relating to the requirement in ATS standard operating procedure regarding the event of an uncertain condition on the runway.

1.6 Aircraft Information

	JT197	IW1252
Registration Mark	PK-LJZ	PK-WFF
Manufacturer	The Boeing Company	Avions de Transport Regional (ATR)
Country of Manufacturer	United States of America	France
Type/Model	Boeing 737-9GP (ER)	ATR 72-212A
Serial Number	37296	0869
Year of Manufacture	2012	2009

4 Working time is the time period when the person attends their particular working shift.

5 Duty time is the time period when the person performs their duty to provide air traffic control service.

	JT197	IW1252
Certificate of Airworthiness		
Issued	13 August 2016	1 December 2016
Validity	12 August 2017	30 November 2017
Category	Transport	Transport
Limitations	None	None
Certificate of Registration		
Number	3140	2682
Issued	13 August 2016	21 December 2016
Validity	12 August 2019	20 December 2019
Time Since New	13,773 hours 15 minutes	14,321 hours 40 minutes
Cycles Since New	10,213 cycles	16,132 cycles
Aircraft height	12.5 meters	7.65 meters

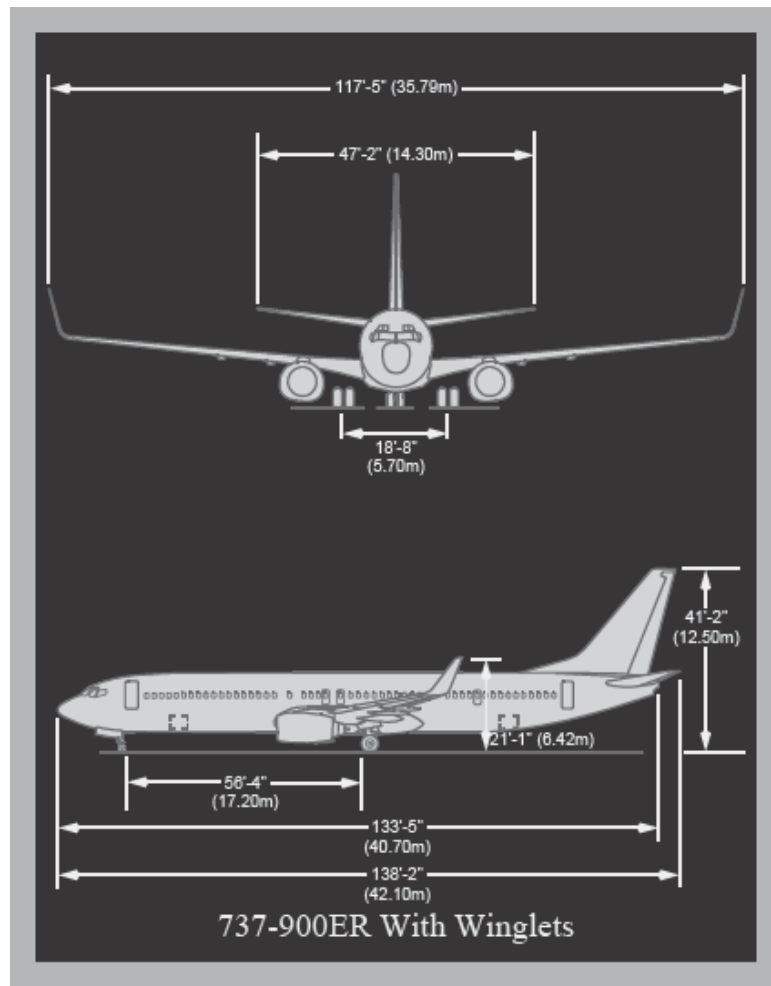


Figure 3: The dimension of Boeing 737-9GP (Copyright © Boeing)

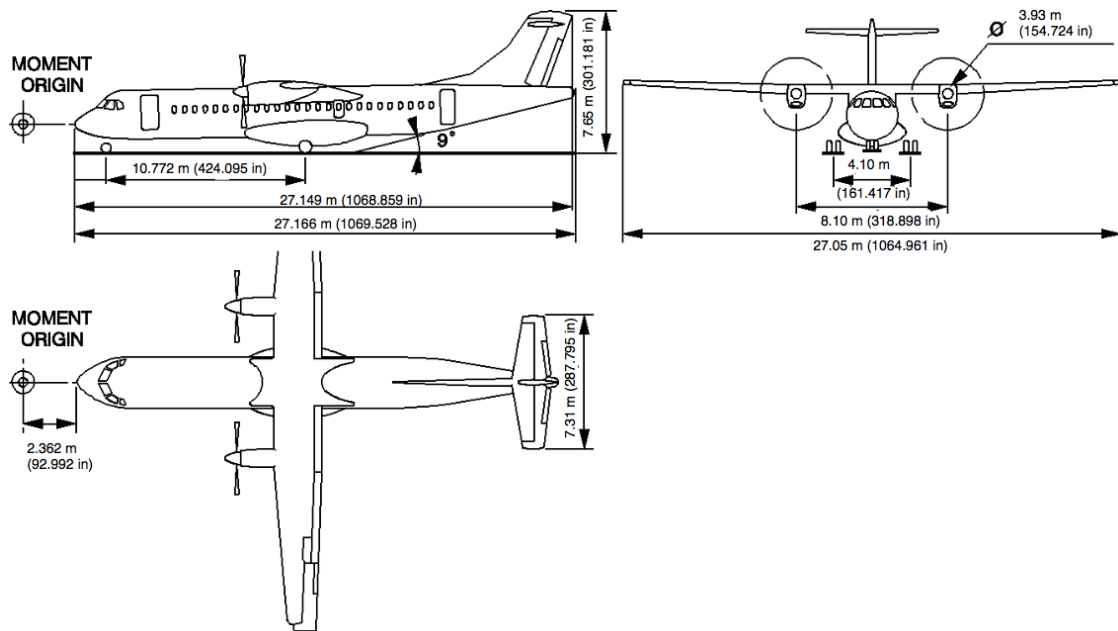


Figure 4: The dimension of ATR72-212A (Copyright © ATR)

1.7 Meteorological Information

The weather during the accident was clear day light with good visibility.

1.8 Aids to Navigation

The runway 23 of Kualanamu International Airport was equipped with Instrument Landing System (ILS) category 1 with Decision Altitude (DA) was 230 feet. There was no record or report of system malfunction for the ILS during the accident.

1.9 Communications

All communications between the air traffic controller and the pilot were normal as recorded on ground based automatic voice recording equipment and Cockpit Voice Recorder (CVR) of both aircraft for the duration of the flight. The quality of the recorded transmission was good.

The excerpt of the communication between the air traffic controller and the pilot is described in the subchapter 1.11.2 Cockpit Voice Recorder.

1.10 Aerodrome Information

Airport name	: Kualanamu International Airport
Airport identification	: WIMM
Airport operator	: PT. Angkasa Pura II (Persero)
Airport certificate	: 073/SBU-DBU/VII/2013, valid up to 5 July 2018
Coordinate	: 03° 38' 32" N; 098° 53' 07" E
Elevation	: 23 feet
Runway direction	: 05/23 (046°/226°)

Runway length : 3,750 meters
Runway width : 60 meters
Surface : Asphalt concrete

1.11 Flight Recorders

The Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) of both aircraft were transported to KNKT recorder facility for data downloading process.

1.11.1 Flight Data Recorder

JT197

The aircraft was fitted with Honeywell FDR HFR5-D model with part number 980-4750-009 and serial number FDR-01723. The FDR contained data of 1,265 parameters with approximately 53.54 hours of aircraft operation, which was containing 39 flights including the accident flight.

The significant events recorded on the JT197 FDR were as follows:

Note: the distance calculations were based on coordinate of both aircraft.

- 03:59:45 UTC, the altitude was 993 feet and the distance with IW1252 was 5,621 meters.
- 03:59:51 UTC, the altitude was 874 feet and the distance with IW1252 was 5,139 meters.
- 04:00:01 UTC, the altitude was 709 feet and the distance with IW1252 was 4,303 meters.
- 04:00:16 UTC, the autopilot disengaged at altitude of 481 feet and the distance with IW1252 was 3,050 meters.
- 04:00:32 UTC, the altitude was 258 feet and the distance with IW1252 was 1,732 meters.
- 04:00:41 UTC, the altitude was 100 feet and the magnetic heading maintained at 224° until touchdown.
- 04:00:46 UTC, the altitude was 37 feet, the N1 was 52%, the ground speed was 160 knots and the distance with IW1252 was 643 meters.
- 04:00:49 UTC, the altitude was 7 feet and the distance with IW1252 was 431 meters.
- 04:00:50 UTC, the aircraft touched down and the distance with IW1252 was 375 meters.
- 04:00:52 UTC, the N1 was 32% and the distance with IW1252 was 230 meters.
- 04:00:53 UTC, the magnetic heading increased gradually (aircraft turned to the right) to highest value of 226° at 04:00:57 UTC then continued reduced gradually (aircraft turned to the left) to the value of 224°.

IW1252

The aircraft was fitted with L-3 Aviation Recorders FDR FA2100 model with part number 2100-4043-00 and serial number 000603281. The FDR contained data of 431 parameters with approximately 200.59 hours of aircraft operation, which was containing 83 flights including the accident flight.

The significant events recorded on the IW1252 FDR were as follows:

- 03:57:17 UTC, the ground speed started to increase gradually
- 03:59:21 UTC, the highest value of ground speed recorded at 12.5 knots
- 03:59:29 UTC, the magnetic heading changed gradually from 316° to 290° at 03:59:51 UTC (aircraft turned to the left) then the heading maintained.
- 03:59:54 UTC, the ground speed recorded 0.
- 04:00:12 UTC, the ground speed started to increase gradually.
- 04:00:17 UTC, the magnetic heading changed gradually from 290°
- 04:00:32 UTC, the aircraft crossed the runway holding position marking (yellow line) at magnetic heading 260°.
- 04:00:46 UTC, the magnetic heading was 250°.
- 04:00:52 UTC, the aircraft crossed the runway side stripe marking (white line) at magnetic heading 243°, the torque increased from 11% to 27%.
- 04:00:56 UTC, the magnetic heading was 237°.
- 04:01:21 UTC, the ground speed recorded 0.
- 04:05:21 UTC, the ground speed started to increase.



Figure 5: The FDR data superimposed with Google Earth

1.11.2 Cockpit Voice Recorder

JT197

The aircraft was fitted with Honeywell Solid State CVR model with part number 980-6022-001 and serial number 120-15334. The CVR recorded 2 hours 52 minutes of good quality recording data.

IW1252

The aircraft was fitted with L-3 Aviation Recorders CVR FA2100 model with part number 2100-1020-02 and serial number 000888669. The CVR recorded 2 hours 4 minutes of good quality recording data.

The significant excerpt of the both CVR was as follows:

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
03:54:29		The IW1252 FA advised the IW1252 pilot that the boarding process was completed.
03:54:51		The IW1252 PM requested clearance to Medan Ground controller for push back and engine start and this was approved.
03:55:10		The IW1252 FA started the passenger safety briefing.
03:56:58		The IW1252 PM requested taxi clearance to the Medan Ground controller and was instructed to follow U2 taxi route.
03:57:13		The IW1252 PF instructed the PM to read the checklist.
03:57:21	The JT197 PM advised the Medan Tower controller that the aircraft was on localizer runway 23.	
03:57:27	The Medan Tower controller acknowledged and issued landing clearance with additional information of wind condition and barometric pressure.	
03:57:28		The IW1252 PM advised the PF that the checklist has been completed.
03:57:36		The IW1252 PF advised the PM to expect departure via intersection taxiway D and this was agreed.
03:57:52	The JT197 PF instructed the PM to perform the landing checklist.	
03:58:00	The JT197 pilot completed the landing checklist.	

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
03:58:24		The Medan Ground controller instructed the IW1252 pilot to contact Medan Tower controller for further instruction.
03:58:34	Recorded same conversation as IW1252 CVR.	The IW1252 PM contacted the Medan Tower controller and was instructed to continue taxi and hold on short runway 23. The IW1252 PM readback the instruction.
03:58:45		The IW1252 PF instructed the PM to request departure via intersection taxiway D.
03:58:46	Recorded same conversation as IW1252 CVR.	The IW1252 PM requested to Medan Tower controller that departure from intersection taxiway D and was approved.
03:58:57		The IW1252 PF instructed the PM to do before takeoff procedure.
03:59:33		The IW1252 PF instructed the PM to read the before takeoff checklist.
03:59:41	EGPWS altitude callout " <i>ONE THOUSAND</i> ".	
03:59:45	Recorded same conversation as IW1252 CVR.	The IW1252 PF advised the Medan Tower controller that their aircraft was close to reaching runway 23.
03:59:48	Recorded same conversation as IW1252 CVR.	The Medan Tower controller confirmed the IW1252 pilot whether they were ready for immediate departure.
03:59:51	The JT197 PF instructed the PM to advise the Medan Tower controller that the JT197 aircraft was on short final runway 23.	
03:59:54	Recorded same conversation as IW1252 CVR.	The Medan Tower controller again requested whether the IW1252 pilot was ready for immediate departure.
03:59:57		The IW1252 PM advised ready to the PF
03:59:58	Recorded same conversation as IW1252 CVR.	The IW1252 PF confirmed to the Medan Tower controller that IW1252 was ready.
03:59:59		The IW1252 FA completed the safety briefing.

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
04:00:01 – 04:00:11	Recorded same conversation as IW1252 CVR.	The Medan Tower controller issued clearance to the IW1252 pilot: <i>“IW1252 behind traffic Lion short final landed passing line up behind runway 23 from intersection Delta additional clearance after departure direct Meulaboh”</i> .
04:00:13	Recorded same conversation as IW1252 CVR.	The IW1252 PM readback part of the clearance: <i>“After departure direct Meulaboh IW1252”</i> .
04:00:14		The IW1252 PF exclaimed that the FA preparation was taking too long.
04:00:15	EGPWS altitude callout <i>“FIVE HUNDRED”</i> .	The Medan Tower controller responded the readback of IW1252 PM by <i>“Namu Tower”</i> .
04:00:16	Cavalry charge. Sound similar autopilot was disengaged	
04:00:18	Recorded same conversation as IW1252 CVR.	Another arriving aircraft pilot advised Medan Tower controller that the aircraft has been established on the localizer runway 23.
04:00:19		The IW1252 FA conducted a before takeoff announcement to the passengers.
04:00:22	Recorded same conversation as IW1252 CVR.	The Medan Tower controller instructed the arriving aircraft pilot to continue the landing approach with additional information of the latest surface wind, QNH and traffic information of aircraft that would depart from runway 23.
04:00:23	EGPWS altitude callout <i>“FOUR HUNDRED”</i> .	
04:00:25		The IW1252 PF exclaimed that the FA announcement had not finished.
04:00:29	EGPWS altitude callout <i>“THREE HUNDRED”</i> .	
04:00:30		The FA announcement finished.
04:00:36	EGPWS altitude callout <i>“TWO HUNDRED”</i> .	The IW1252 PM advised takeoff station to the FA.
04:00:42	EGPWS altitude callout <i>“ONE HUNDRED”</i> .	
04:00:45	EGPWS altitude callout <i>“FIFTY”</i> .	

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
04:00:46	<ul style="list-style-type: none"> The JT197 PM advised to the PF of the IW1252 position which was close to the runway. EGPWS altitude callout <i>"FORTY"</i>. 	
04:00:47	EGPWS altitude callout <i>"THIRTY"</i> .	
04:00:48	EGPWS altitude callout <i>"TWENTY"</i> .	
04:00:49	<ul style="list-style-type: none"> The JT197 PM re-advised to the PF of the IW1252 position which was close to the runway EGPWS altitude callout <i>"TEN"</i>. 	
04:00:50	Touchdown sound	
04:00:52	The JT197 PM advised to the PF that IW1252 was entering runway and this was acknowledged.	
04:00:56	Impact sound.	Impact sound.
04:01:00	The JT197 PF asked to the Medan Tower controller why there was an aircraft on the runway.	Recorded same conversation as JT197 CVR.
04:01:09	The Medan Tower controller responded by <i>"yes Sir"</i> .	Recorded same conversation as JT197 CVR.
04:01:12	The JT197 PF declared urgency message (PAN PAN) to the Medan Tower controller.	Recorded same conversation as JT197 CVR.
04:01:14	The JT197 PM re-declared urgency message (PAN PAN) to the Medan Tower controller and was responded by <i>"go ahead"</i> .	Recorded same conversation as JT197 CVR.
04:01:18	The JT197 PF asked to the Medan Tower controller why there was an aircraft on runway.	Recorded same conversation as JT197 CVR.
04:01:20		The IW1252 PM confirmed to the PF that they had received takeoff clearance.
04:01:21	The Medan Tower controller responded by <i>"yes Sir"</i> .	Recorded same conversation as JT197 CVR.
04:01:29		The IW1252 PM advised the PF that their right wing impacted with the landing aircraft. The PF responded that they had clearance to enter the runway.
04:01:34	The JT197 PM commanded the FA <i>"ATTENTION CREW ON STATION, ATTENTION CREW ON STATION"</i> .	

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
04:01:59	The JT197 PF contacted the Medan Tower and was instructed to vacate runway via taxiway G. The JT197 PF advised to the Medan Tower that the aircraft has touched down and asked why there was aircraft on runway 23. The Medan Tower supervisor responded by requesting the pilot to standby.	Recorded same conversation as JT197 CVR.
04:02:25		The IW1252 PF confirmed to the PM that they have been cleared for immediate takeoff and the confirmed.
04:02:36	The Medan Tower supervisor instructed the other arriving aircraft pilot to make and overshoot due to traffic. The other arriving aircraft pilot requested to make orbit to the left and was approved.	Recorded same conversation as JT197 CVR.
04:03:02	Recorded same conversation as IW1252 CVR.	The IW1252 PF contacted Medan Tower and was requested to standby. The Medan Tower supervisor then instructed the JT197 pilot to contact Medan Ground controller.
04:03:18	The JT197 PM contacted Medan Ground controller and was instructed to continue taxi to parking bay number 31.	
04:03:20		The Medan Tower supervisor issued clearance to the IW1252 pilot to turn left heading 315 after airborne to which they responded that IW1252 was unable to depart. The Medan Tower supervisor then instructed the IW1252 pilot to hold on the runway.
04:03:37	The JT197 PF confirmed to the PM that the clearance to IW1252 was to line up after the JT197 landed and the PM affirmed.	The IW1252 PF asked PM whether their wing impacted with JT197. This was confirmed and there were some broken parts.
04:03:56		The IW1252 PF instructed the FA to remain seated and the aircraft would return to apron. The FA acknowledged the instruction and informed the passengers that the condition was fine.
04:04:40		The Medan Tower supervisor issued takeoff clearance to the IW1252 pilot to whom they responded that IW1252 was unable to depart and requested to return to the apron.

UTC	RECORDED on JT197 CVR	RECORDED on IW1252 CVR
04:05:01		The IW1252 PF requested to return the aircraft to apron to inspect for any damage to the aircraft.
04:05:11		The Medan Tower supervisor instructed the IW1252 pilot to vacate runway via taxiway E and then to contact the Medan Ground controller.
04:05:21		Another departure aircraft pilot advised Medan Tower that their aircraft was on taxiway C and they would hold on short runway 23. The Medan Tower supervisor instructed the other departure aircraft pilot to standby.
04:05:40		The Medan Tower supervisor instructed the other departure aircraft pilot to line up runway 23, and this was acknowledged.
04:07:17		The IW1252 PM contacted the Medan Ground controller and then received taxi clearance to parking bay number 2.
04:08:55	The JT197 PM advised the Medan Ground controller of the possibility of aircraft debris on the runway that might become hazardous to the other aircraft. The Medan Ground controller acknowledged the information.	Recorded same conversation as JT197 CVR.
04:10:51	The JT197 PM re-advised the Medan Ground controller that there were debris on the runway abeam of taxiway A and this was responded to by saying that the runway maintenance unit has been informed.	Recorded same conversation as JT197 CVR.

1.12 Wreckage and Impact Information

After receiving the information of debris on the runway, the Medan Tower supervisor contacted the Airport Runway and Accessibility unit to check the runway condition. The runway inspection team proceeded to the runway and found debris on the runway, mostly on the right side of the runway 23 centerline.

Debris found on the runway are shown on the following figure that was taken by Airport Runway and Accessibility personnel.



Figure 6: The debris on runway

1.12.1 JT197

The left wing was damaged on the wing leading edge approximately 3.4 meters long. The slat number 1 was damage approximately 3.4 x 0.4 meters. Part of the slat with dimension approximately 65 × 40 centimeters was detached.



Figure 7: The damaged wing of JT197

The winglet area had several dents including damaged on the navigation light. The damages were as follows:



Figure 8: The damage on the left wing of JT197



Figure 9: Part of slat number 1 recovered from the runway

1.12.2 IW1252

The right wing from wing rib 24 until the wing tip was broken and detached with the length approximately of 2.8 meters. Part of the broken wing was found stuck on the right pitot tube. The illustration of the damage is shown in the following figure.

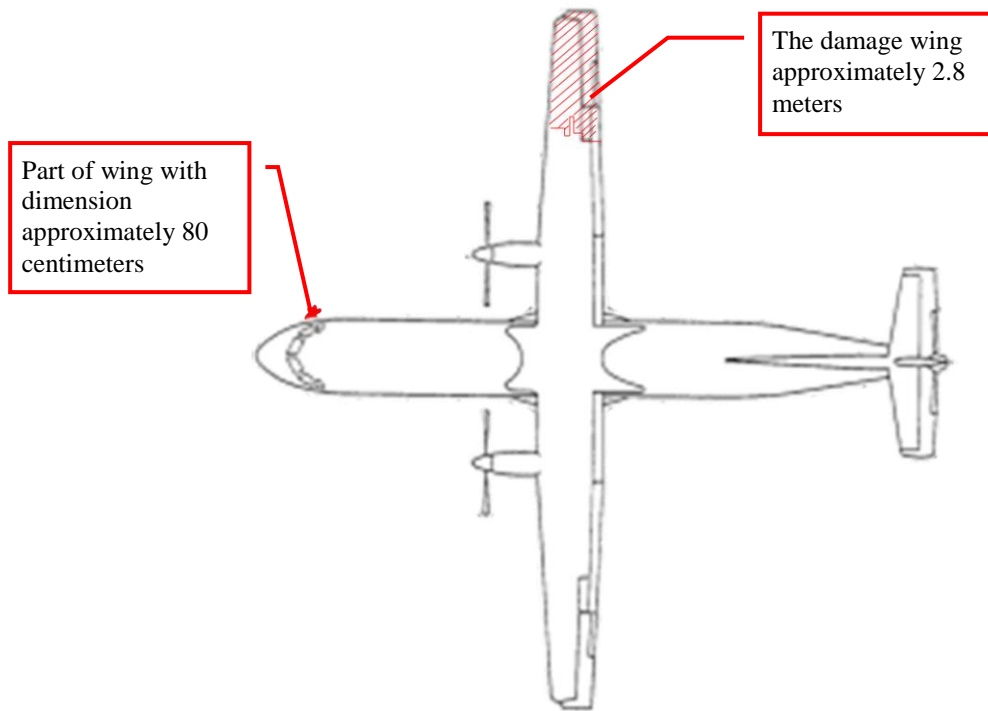


Figure 10: The IW1252 damage



Figure 11: Damage on the right wing with part of the wing striking the pitot tube

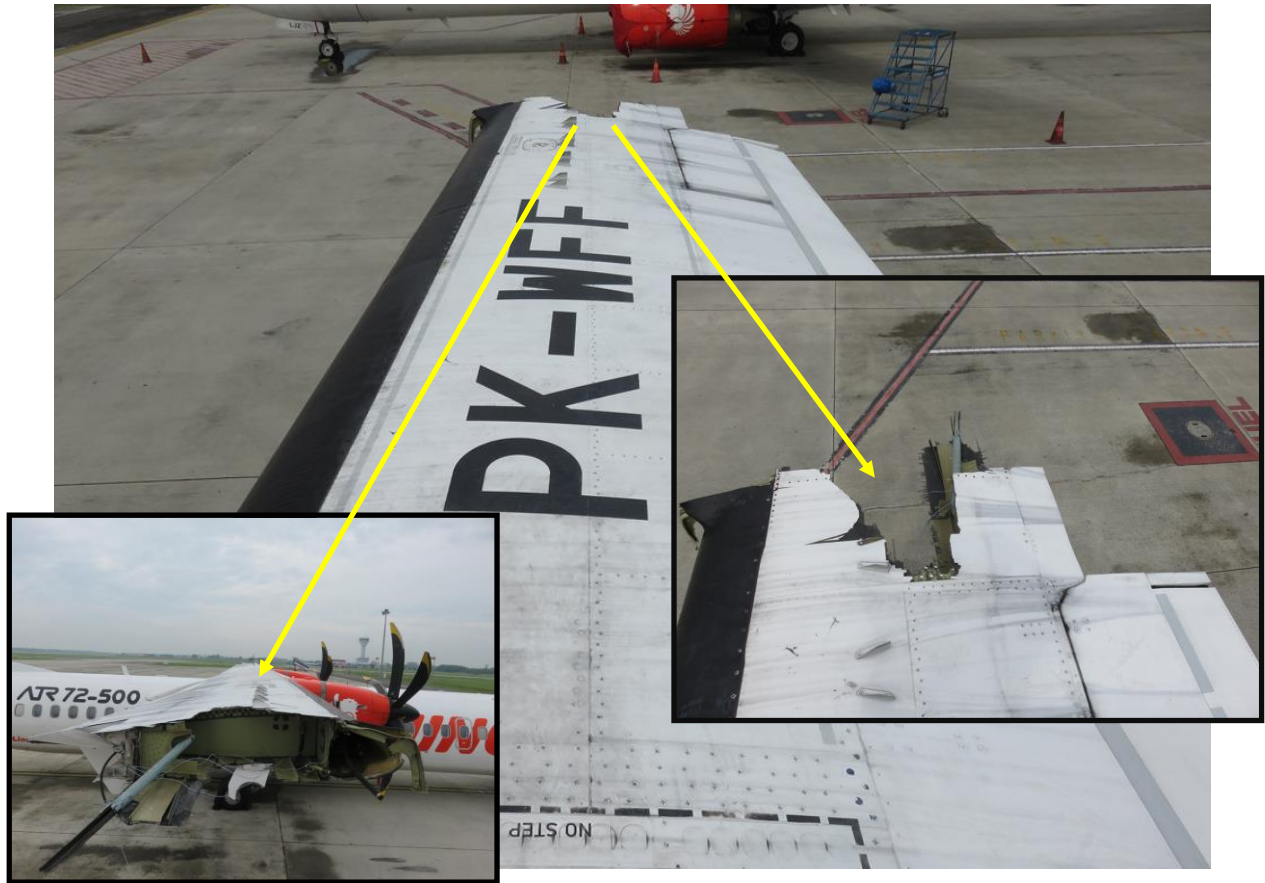


Figure 12: The broken wing



Figure 13: Part of the damaged wing that stuck at the pitot tube

During the investigation, the KNKT reconstructed the broken wing of IW1252. The reconstruction of the broken wing is shown in the following figure.



Figure 14: The reassembled wing

1.13 Medical and Pathological Information

No medical and pathological examination conducted following the accident.

1.14 Fire

There was no evidence of fire during this accident.

1.15 Survival Aspects

After the accident, the JT197 continued taxi to the apron while the IW1252 returned to apron. Passengers of both aircraft disembarked normally.

1.16 Tests and Research

There was no test and research conducted.

1.17 Organizational and Management Information

1.17.1 PT. Lion Mentari Airlines

PT. Lion Mentari Airlines (Lion Air) located at Jalan Gajah Mada No. 7 Jakarta Pusat, Republic of Indonesia. The aircraft operator has a valid Air Operator Certificate (AOC) number 121-010.

The JT 197 aircraft was owned by Pacific Aircraft Leasing, LLC, which was located at 1100 North Market Street, Wilmington, DE, 19890-1605 United States of America and operated by PT. Lion Mentari Airlines.

Operations Manual Part A

The Lion Air Operations Manual Part A (OM-A) subchapter 8.3.2.10 encouraged pilots to go-around whenever any doubt exists as to the safe continuation of an approach and/or landing. A go-around is regarded as a normal flight procedure.

Boeing 737 NG Flight Crew Training Manual

The aircraft operator utilized Boeing 737 NG Flight Crew Training Manual (FCTM) which also covered for the Boeing 737-900ER type aircraft, to provide information and recommendations on maneuvers and techniques for the pilot. According to the FCTM chapter 5, during an automatic go-around⁶ initiated at 50 feet, approximately 30 feet of altitude is lost.

1.17.2 PT. Wings Abadi Airlines

PT. Wings Abadi Airlines (Wings Air) located at Jalan A.M. Sangaji No. 17 Jakarta Pusat, Indonesia. The aircraft operator has a valid Air Operator Certificate (AOC) number 121-012. The Wings Air operated 20 ATR 72-500 aircraft and 32 ATR 72-600 aircraft.

The IW1252 aircraft was owned by Pacific Aviation 8A S.A.S., was located at at 23 Rue de Roule, 75001 Paris, France and operated by PT. Wings Abadi Airlines.

1.17.2.1 Wings Air Operation Manual Part A

The Operations Manual Part A (OM-A) subchapter 8.3.1.8 described that runway incursions could occur as a result of a misunderstanding of ATC instructions. Therefore, pilots are required to maintain the highest level of situational awareness to avoid such occurrences using several ways such as monitoring of communications, visual sighting and the use of TCAS traffic indications.

The subchapter 8.3.1.8 also described that pilots have an obligation to stop the aircraft and seek air traffic controller instruction at any time when there is confusion of an air traffic control clearance or instruction. A higher risk of incursion may exist under the circumstances of unusually high workload of pilots and/or incomplete or undetected incorrect readback of clearances.

The subchapter 8.3.3.2.3 described that all ATC clearances must be fully understood. Where there is any doubt regarding either the intent or the content of an ATC clearance or ATC message by any Flight Crew member, clarification must be immediately obtained. Clearances must be received and understood by both Flight Crew members.

1.17.2.2 ATR 72 Flight Crew Operation Manual

The ATR 72 Flight Crew Operation Manual (FCOM) Volume 2, part 2.3.12 described that while taxiing the task of the right seated pilot (SIC) was to handle radio communications, and the left seated pilot (PIC) was to control the aircraft movement, as the nose wheel steering available on the left side.

⁶ Automatic go-around is only available in a dual autopilot engaged approach such as an autoland approach.

1.17.3 AirNav Indonesia

AirNav Indonesia (*Perum LPPNPI – Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia*) is a state-owned enterprise which provides air navigation services within Indonesia airspace including the provision of air traffic control services in Medan. The services provided by AirNav Indonesia branch Medan provided by aerodrome tower unit (Medan Tower) and approach control unit (Medan Approach).

Air Traffic Services Standard Operating Procedure

The AirNav Indonesia branch Medan has Air Traffic Services (ATS) Standard Operating Procedure (SOP) as a standardize guidelines for ATS personnel to perform their daily task. The relevant parts of the ATS SOP of AirNav Indonesia branch Medan are described as follows:

CHAPTER VII AERODROME CONTROL SERVICE

7.1.1.4 Aerodrome controllers shall maintain a continuous watch on all flight operations on and in the vicinity of an aerodrome as well as vehicles and personnel on the manoeuvring area.

7.4.1.3 Procedure Departure Clearance

b. The aircraft shall take off at the beginning of the runway. Take off from intersection of runway is possible upon pilot request and approved by the aerodrome controller by giving information about Runway length available;

c. In the interest of expediting traffic, a clearance for immediate take off may be issued to an aircraft before it enters the runway and the aircraft shall taxi out to the runway and take off in continuously movement;

CHAPTER XI PHRASEOLOGY AND COORDINATION

11.1 Phraseologies

11.1.3.9 PREPARATION FOR TAKE-OFF

- | | |
|---|---|
| <i>... conditional clearances</i> | <i>‡i) (condition) LINE UP (brief reiteration of the condition);</i> |
| <i>... acknowledgement of a conditional clearance</i> | <i>*j) (condition) LINING UP (brief reiteration of the condition);</i> |
| <i>... confirmation or otherwise of the readback of conditional clearance</i> | <i>k) [THAT IS] CORRECT (or NEGATIVE) [I SAY AGAIN] ... (as appropriate).</i> |

** Denotes pilot transmission.*

† When there is the possibility of confusion during multiple runway operations.

‡ Provisions concerning the use of conditional clearances are contained in Document 4444 Sixteenth Edition 2016 Chapter 12, 12.2.7.

CHAPTER XIII GENERAL OPERATIONS

13.1 Introduction

13.1.5 If there is any doubt about the safety or preparedness of local services movement, air traffic control must immediately inform the competent authorities or ATS Operation Coordinator. And ask inspected for areas that doubt - for delay departure and arrival the airport until the inspection results are known, and safety or preparedness services are no longer in doubt.

Note: This is especially important when air traffic control tower have a reason of the existence of foreign objects or debris falling possibility movement area due to aircraft operations that are not normal.

Air Traffic Controller Performance Check

The AirNav Indonesia branch Medan conducted performance check every six months as part of requirement to maintain air traffic controller rating. The performance check was one of the methods used to maintain air traffic control competency in accordance with the aviation requirement standard including the ATS SOP.

Prior to the performance check, a briefing was conducted to refresh the air traffic control knowledge, including procedures as described in the ATS SOP. The performance check consisted of theoretical and practical check. The practical check was performed in real situations by the examining the air traffic controller, and performed during the daily duty while controlling air traffic. No simulation of handling unusual and/or emergency situation was examined.

1.17.4 PT. Angkasa Pura II

PT. Angkasa Pura II is a state-owned enterprise which was engaged in the airport services and airport related services in Indonesia, including Medan. The airport services in Medan are provided by PT. Angkasa Pura II branch office Kualanamu International Airport Medan.

1.17.5 Directorate General of Civil Aviation

The Directorate General of Civil Aviation (DGCA) is the organization under the Ministry of Transportation that responsible in formulating policy and standard regarding the civil aviation in Indonesia. There were several Civil Aviation Safety Regulations (CASRs) and Advisory Circulars (ACs) issued by the DGCA which are relevant to this investigation.

1.17.5.1 CASR part 25: Airworthiness Standards

The CASR part subchapter 25.119 mentioned that in the landing configuration, the steady gradient of climb may not be less than 3.2%, with the engines at the power or thrust that is available 8 seconds after initiation of movement of the power or thrust controls from the minimum flight idle to the go-around power or thrust setting.

1.17.5.2 AC 170-02: Manual of Air Traffic Services Operational Procedures

The AC 170-02 was a guideline to the Air Traffic Services (ATS) personnel (air traffic controller and flight information services officer) to perform the duty. Although the procedures are mainly directed to air traffic services personnel, flight crews should be familiar with the procedures contained in the AC 170-02.

The relevant excerpt from the AC 170-02 was as follows:

CHAPTER 4. GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

4.5 Air Traffic Control Clearances

4.5.7 Description of air traffic control clearances

4.5.7.5 Read-Back of Clearances

4.5.7.5.1 The flight crew shall readback to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be readback:

- a) ATC route clearances;*
- b) clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway; and*
- c) runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in automatic terminal information service (ATIS) broadcasts, transition levels.*

4.5.7.5.1.1 Other clearances or instructions, including conditional clearances, shall be readback or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

4.5.7.5.2 The controller shall listen to the readback to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the readback.

CHAPTER 12. PHRASEOLOGIES

12.1 COMMUNICATIONS PROCEDURES

12.2 GENERAL

12.2.7 Conditional phrases, such as “behind landing aircraft” or “after departing aircraft”, shall not be used for movements affecting the active runway(s), except when the aircraft or vehicles concerned are seen by the appropriate controller and pilot. The aircraft or vehicle causing the condition in the clearance issued shall be the first aircraft/vehicle to pass in front of the other aircraft concerned. In all cases a conditional clearance shall be given in the following order and consist of:

- a) identification;*
- b) the condition;*
- c) the clearance; and*
- d) brief reiteration of the condition,*

for example:

“SAS 941, BEHIND DC9 ON SHORT FINAL, LINE UP BEHIND”.

Note.— This implies the need for the aircraft receiving the conditional clearance to identify the aircraft or vehicle causing the conditional clearance.

12.2.10 Examples of the application of the phraseologies may be found in the Manual of Radiotelephony (Doc 9432).

1.17.5.3 AC 69-01: License, Rating, Training and Competency for Air Traffic Controller

According to AC 69-01 article 21, a licensed air traffic controller while conducting air traffic service in aerodrome control unit shall have aerodrome control rating. The article 27 of this AC described that a plan to handle an emergency situation including plan to assist the search and rescue activities become one of the requirement to be rated as aerodrome tower controller.

The aerodrome control rating valid for 6 months and could be maintained through a check rating. Prior to the check rating, air traffic controller shall receive briefing material to refresh his/her knowledge regarding the minimum knowledge requirement as aerodrome tower controller including knowledge of Standard Operating Procedure (SOP). The check rating consists of theoretical and practical check.

1.17.6 ICAO Document 9432: Manual of Radiotelephony

2.2 Transmitting Technique

2.2.1 The following transmitting techniques will assist in ensuring that transmitted speech is clear and satisfactorily received:

- a) before transmitting, listen out on the frequency to be used to ensure that there will be no interference with a transmission from another station;*
- b) be familiar with good microphone operating techniques;*
- c) use a normal conversational tone, and speak clearly and distinctly;*
- d) maintain an even rate of speech not exceeding 100 words per minute. When it is known that elements of the message will be written down by the recipient, speak at a slightly slower rate;*
- e) maintain the speaking volume at a constant level;*
- f) a slight pause before and after numbers will assist in making them easier to understand;*
- g) avoid using hesitation sounds such as “er”;*
- h) be familiar with te microphone operating techniques, particularly in relation to the maintenance of a constant distance from the microphone if a modulator with a constant level is not used;*
- i) suspend speech temporarily if it becomes necessary to turn the head away from the microphone;*
- j) depress the transmit switch fully before speaking and do not release it until the message is completed. This will ensure that the entire message is transmitted;*
- k) the transmission of long messages should be interrupted momentarily from time to time to permit the transmitting operator to confirm that the frequency in use is clear and, if necessary, to permit the receiving operator to request repetition of parts not received.*

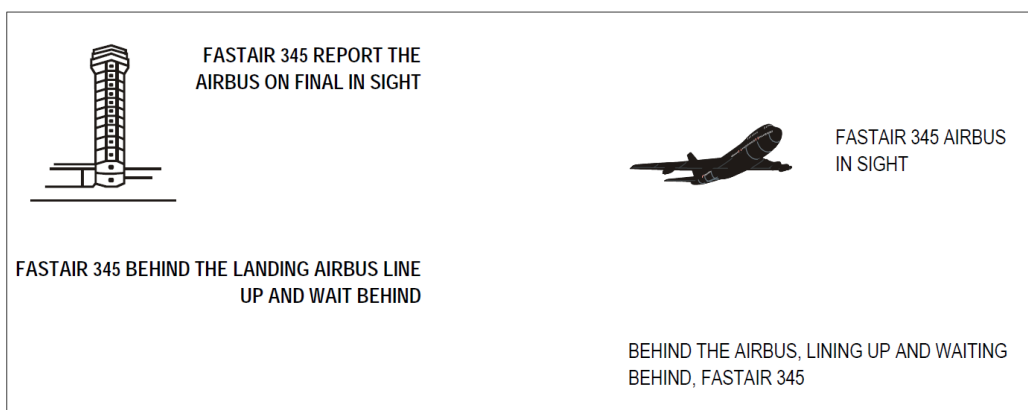
2.8.3 Issue of clearance and read-back requirements

2.8.3.2 *Controllers should pass a clearance slowly and clearly since the pilot needs to write it down and wasteful repetition will thus be avoided. Whenever possible, a route clearance should be passed to an aircraft before start up. In any case, controllers should avoid passing a clearance to a pilot engaged in complicated taxiing manoeuvres and on no occasion, should a clearance be passed when the pilot is engaged in line up or take-off manoeuvres.*

2.8.3.3 *An air traffic control (ATC) route clearance is not an instruction to take off or enter an active runway. The words “TAKE OFF” are used only when an aircraft is cleared for take-off, or when cancelling a take-off clearance. At other times, the word “DEPARTURE” or “AIRBORNE” is used.*

2.8.3.4 *Read-back requirements have been introduced in the interests of flight safety. The stringency of the read-back requirement is directly related to the possible seriousness of a misunderstanding in the transmission and receipt of ATC clearances and instructions. Strict adherence to read-back procedures ensures not only that the clearance has been received correctly but also that the clearance was transmitted as intended. It also serves as a check that the right aircraft, and only that aircraft, will take action on the clearance.*

The following is the example of the application of the conditional clearance.



1.18 Additional Information

Investigation involved National Transport Safety Board (NTSB), United States of America and Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation (BEA), France that assigned accredited representative according to the ICAO Annex 13.

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 ANALYSIS

Referring to the gathered information, there was no record or report of both aircraft system malfunction. The investigation considered that the aircraft serviceability was not issue in the accident. Therefore, the analysis will discuss the relevant issues as follows:

- IW1252 movement;
- JT197 movement;
- Air traffic controller attention;
- Conditional clearance;
- Hazard Identification on runway.

2.1 IW1252 Movement

According to the flight plan, the IW1252 was scheduled to depart from Medan at 0345 UTC. Prior to the departure there was problem with passenger baggage handling and delayed the departure. IW1252 pilot requested for taxi clearance 11 minutes after the schedule for departure.

While the Medan Tower controller issued landing clearance to the JT197, the IW1252 pilots did not monitor this communication since they were communicating with the Medan Ground frequency. This made the IW1252 did not aware of JT197 that was on final and had received landing clearance.

The IW1252 pilot requested to Medan Tower controller to depart from intersection taxiway D with intention to expedite the departure as the flight had delayed and was approved. The takeoff from intersection runway upon pilot request was allowed in accordance with the ATS SOP.

The IW1252 PF instructed the PM to read the before takeoff checklist. While the IW1252 PM was reading the before takeoff checklist, the PF advised the Medan Tower controller that the aircraft was on short runway 23 and the Medan Tower controller requested confirmation that the IW1252 pilot was ready for immediate departure. There was no response from the pilots since the PM was still reading the before takeoff checklist.

During aircraft taxi or ground movement, it is the task of the right seated pilot (SIC) to handle radio communication, and the left seated pilot (PIC) to control the aircraft movement, as the nose wheel steering available on the left side. Contrary to this the PF contacted to the air traffic controller which might be an indication that the PF intended to expedite the departure.

The Medan Tower controller again requested re-confirmation that the IW1252 pilot was ready for immediate departure. At this time the recorded value of IW1252 ground speed on the FDR was 0 indicating that the aircraft was stopped short runway 23. Three seconds later the IW1252 PM finished the checklist reading and then the IW1252 PF advised the Medan Tower controller that they were ready for immediate departure.

The confirmation of the IW1252 ready for immediate departure was intended to depart the IW1252 after the JT197 landed with sufficient separation from another arriving aircraft that was behind JT197

Between 04:00:01 to 04:00:11 UTC, after the IW1252 pilot confirmed that they ready for immediate departure, the Medan Tower controller issued conditional clearance, combined with ATC route clearance, at a rate of speech faster than the recommendation described in the ICAO Document 9432 (see subchapter 2.4 in this report).

The IW1252 PM, who was relatively low experience (109 flight hours), was unable to receive all the information of the clearance that was delivered faster than the requirement. The IW1252 PM readback only contained the last sentence without repeating the conditional clearance.

The Operations Manual Part A (OM-A) subchapter described all air traffic control clearances must be fully understood. Where there is any doubt regarding either the intent or the content of an air traffic control clearance by any pilot, clarification must be immediately obtained. Clearances must be received and understood by both pilots.

In the previous experience, the Medan Tower controller did not recall any pilot misunderstanding a conditional clearance. Even though the readback was incomplete, the Medan Tower controller assumed that the pilot acknowledged the clearance properly and the required immediate action to correct the discrepancies of the pilot readback, was considered not necessary.

At 04:00:11 UTC, before the IW1252 completed the readback, the FDR data recorded that the ground speed started to increase which indicated that the aircraft started to move to enter the runway. This indicates that the PF initiated the taxi to enter the runway, contrary to the conditional clearance to enter the runway behind traffic on final. This indicated that the PF did not closely monitor to the communications. This might be due to the PF being focused on making an immediate departure as the flight had been delayed.

At 04:00:22 UTC, the Medan Tower controller instructed other arriving aircraft pilot that was established on the localizer runway 23, to continue the landing approach and advised that there was aircraft that would depart from runway 23. The intention to provide the traffic information was to make the other arriving aircraft pilot aware of the IW1252 that would be departed after JT197 landed. This transition may have made the IW1252 pilot confident that they were first in the sequence, as they did not hear the communication and not aware of JT197 that was on final.

At 04:00:32 UTC, the IW1252 aircraft crossed the runway holding position marking. This movement was not recognized by the Medan Tower controller since their attention was changed to the other arriving aircraft.

At 04:00:56 UTC, both CVRs of the aircraft recorded impact sound as the left wing of JT197 collided with the right wing of the IW1252.

The IW1252 pilots assuming that they had clearance to enter the runway 23 for departure caused by combination of:

- requested confirmation from the Medan Tower controller for IW1252 to make an immediate departure,
- an incomplete understanding of clearance that was delivered faster than the requirement,
- absence of correction to the incomplete readback from the pilot of IW1252,
- information transmitted to other arriving traffic that the IW1252 would depart,
- the pilots of IW1252 not being aware of JT197 had received landing clearance.

2.2 JT197 Movement

At 03:59:45 UTC, the IW1252 pilot advised the Medan Tower controller that the aircraft was close to reaching runway 23. The Medan Tower controller responded by requesting confirmation that the IW1252 has ready for immediate departure. JT197 was at an altitude of 993 feet. The JT197 pilots heard the immediate departure confirmation from the IW1252 pilot, the PF instructed the PM to advise Medan Tower controller that the JT197 was on short final. The pilots of JT 197 then heard the conditional clearance for IW1252 to line up after they had landed and decided not to remind the Medan Tower controller that they were on short final.

The clearance issued by Medan Tower controller, which was delivered at a faster rate than the requirements in the ICAO Document 9432, was understood by JT197 pilots because they were focusing on the communication.

At 04:00:16 UTC, the autopilot disengaged at altitude of 481 feet.

At 04:00:46 UTC, at an altitude of 37 feet, the JT197 PM advised to the PF of the close position of IW1252 to the runway. The distance between these two aircraft was approximately 643 meters. At this time IW1252 had not crossed the runway side strip marking. The JT197 PF was aware that the clearance for the IW1252 was to enter the runway after the JT197 landed. The JT197 pilot assumed that the IW1252 would not enter the runway. Therefore, the JT197 PF decided to continue the landing approach and focused on handling the aircraft.

At 04:00:49 UTC, as JT197 passed about 7 feet, and the distance between these two aircraft was approximately 431 meters, the PM of JT 197 re-advised the PF of the position of IW1252 which was close to the runway.

The JT197 pilot assumed that the IW1252 would not enter the runway and decided to continue the landing.

One second later, JT197 touched down and two seconds later the JT197 PM advised the PF that that the IW1252 aircraft was entering runway, which was acknowledge, at this time the IW1252 had crossed the runway side strip marking (white line).

At 04:00:56 UTC, JT197 collided with IW1252.

Go-around Altitude Clearance Calculation

At 04:00:46 UTC, the JT197 PM advised to the PF of the IW1252 position which close to the runway. This might be the first pilot recognition to the IW1252 that was suspected would enter the runway. The FDR recorded that the altitude was 37 feet, the N1 was 52.58%, the ground speed was 160 knots and the distance to the IW1252 was about 643 meters.

The CASR part 25 required an aircraft in the landing configuration, the steady gradient of climb shall not be less than 3.2%, with the engines at the power or thrust that is available 8 seconds after initiation of movement of the power or thrust controls from the minimum flight idle to the go-around power or thrust setting. In most aircraft it is common to continue to descend shortly after a go-around is initiated. This loss in height is due to the delay in the engines reaching climb power and the time it takes to pitch the aircraft up to a climb attitude. In Boeing 737-900ER, height loss in these situations is typically limited to 30-50 feet when the correct technique is adopted by the pilot.

Refer to the condition above, assumed the JT197 pilot decided to go around at the first time when the PM suspected that the IW1252 aircraft was about to enter the runway at 04:00:46 UTC, the calculation was made as follows:

- The FDR recorded the altitude was 37 feet, the ground speed was 160 knots, the distance to the IW1252 was about 643 meters and the N1 was indicated that the engines were not in idle position.

Taking into account an expected height loss shortly after a go-around is initiated, a go around executed as the aircraft was descending through 37 feet would most likely not have avoided the collision. Additionally, the time it took for the PM to advise the PF of the position of IW1252 may have resulted in further delays in initiating the go-around. Therefore, initiation of a go-around from 37 feet, may have resulted in more severe circumstances.

Pilot Decision after Touchdown

After touchdown, at 04:00:53 UTC, the JT197 FDR recorded a magnetic heading change from 224° to 226° indicating the aircraft turned to the right and at 04:00:57 UTC, the heading then returned to the left at 224°. This maneuver was the pilot's action to avoid the collision while maintaining the aircraft in the runway between the runway centerline and the runway edge.

The pilot decision to move away from the runway centerline avoided a centerline collision however, the wing collision was unavoidable. The wing collision was less severe compared than an aircraft collision on the runway centerline.

2.3 Air Traffic Controller Attention

The ATS SOP subchapter 7.1.1.4 requires aerodrome/tower controller to maintain a continuous watch on all flight operations on and in the vicinity of an aerodrome.

Prior to the collision, the Medan Tower controller handled three aircraft consisting of one departure aircraft (IW1252) and two arrival aircraft (JT197 and other arriving aircraft). The Medan Tower controller planned to depart the IW1252 after the JT197 landing and before the other arriving aircraft had landed.

Between 04:00:01 until 04:00:15 UTC, there was communication between Medan Tower controller and IW1252 pilot regarding conditional clearance to line up after JT197 landed. Based on previous experience, the Medan Tower controller did not recall any pilot misunderstanding while issuing conditional clearance therefore, the Medan Tower controller assumed that the IW1252 pilot acknowledged the clearance and would line up after JT197 landing, despite an incomplete readback of the conditional clearance.

At 04:00:11 UTC, the IW1252 FDR data recorded the ground speed started to increase which indicated that the aircraft continued taxi to enter the runway

At 04:00:18 UTC, the other arriving aircraft pilot advised the Medan Tower controller that the aircraft has been established on the localizer runway 23. The Medan Tower controller attention then changed to the tower desk controller to monitor the latest value of wind condition and QNH.

Between 04:00:22 until 04:00:32 UTC, the Medan Tower controller was communicating to the other arriving aircraft's pilot regarding the latest wind and QNH value, and information of departure aircraft would depart from runway 23. Thereafter, the Medan Tower controller monitored the distance of the other arriving aircraft to touchdown on the aircraft situational display (radar display), on the tower desk controller. The distance was to calculate the separation between other arriving aircraft with the IW1252 that would depart after JT197 landed.

The Medan Tower controller did not observe when IW1252 crossing the runway holding position marking and the runway side stripe marking.

The movement of IW1252 was not monitored by the Medan Tower controller due to the controller activities to control the other arriving aircraft and the controller assumption that the IW1252 pilot had understood the clearance to line up after JT197 landing.

2.4 Conditional Clearance

The ICAO Document 9432 subchapter 2.2 recommended an even rate of speech should not exceed 100 words per minute to ensure that transmitted speech is clear and satisfactorily received.

The Medan Tower controller issued the conditional clearance combined with ATC route clearance in 10 seconds as follows:

“Wings Abadi ONE TWO FIVE TWO behind traffic Lion short final landed passing line up behind runway TWO THREE from intersection DELTA additional clearance after departure direct Meulaboh”

The clearance consisted of 28 words which were delivered in 10 seconds which means the speech rate was 168 words per minute. Compared to the 100 words per minute, the 28 words given in 10 seconds were considered faster than the recommended practice of the transmitting technique.

According to AC part 170-02, the conditional clearance such as “behind landing aircraft” or “after departing aircraft”, shall not be used for movements affecting the active runway, except when the aircraft or vehicles concerned are seen by the appropriate controller and pilot.

The CVR did not record confirmation from the IW1252 pilot that they had seen the JT197 aircraft. The conditional clearance to line up behind was issued without confirmation whether the arriving aircraft has been seen by the departure pilot and was issued with additional ATC route clearance.

The Medan Tower controller had been trained in the requirement to use the conditional clearance when they studied to become an air traffic controller in aviation college in 2015. The investigation could not find documentation that indicated that the conditional clearance requirement has been rehearsed to the Medan Tower controller since then. The information stored in the memory for more than two years without any rehearsal was very likely to be forgotten.

Conditional clearance involving departing and arriving aircraft without confirmation whether the departing aircraft correctly identifies the arriving aircraft, was often used by the Medan Tower controller. There was no correction from the other controllers or during the performance check briefing regarding the deviation to the requirement mentioned in the AC part 170-02. In addition, the Medan Tower controller did not recall any previous pilot misunderstandings when issuing a conditional clearance.

The procedure to issue conditional clearance in the ATS SOP of the AirNav Indonesia branch Medan did not describe in detail the requirement stated in the AC part 170-02. The ATS SOP referred to the ICAO Document 4444 for the example of the phraseology and the detailed the requirements of conditional clearances.

The information stored in the memory for more than two years without any rehearsal was very likely to be forgotten. In addition, the previous inappropriate use of procedure without correction might have made the controller believe that the procedure was correct. The absence of a detailed requirement in the ATS SOP most likely made the controller overlook the requirement.

2.5 Hazard Identification on Runway

The decision to use Rapid Exit Taxiway for departure

The IW1252 pilot's request to use the Rapid Exit Taxiway (RET) for departure was intended to expedite the departure, as the flight has delayed. The ATS SOP described that initiation to takeoff from intersection runway upon pilot request was allowed. The acute angle of RET may have made it difficult for the pilot of IW 1252 to see JT 197 on short final. The RET acute angle was designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

Hazard may exist for departure aircraft from RET especially when requires conditional clearance to line up behind landing aircraft as the difficulty for departure pilot to see arriving aircraft. The investigation could not find a procedure for air traffic control to give precaution to pilots when using the RET for departure. In addition, the precautions to use RET for departure also never been mentioned a hazard during the daily operation in Medan prior to the occurrence.

The issue of a conditional clearance to the departure aircraft on RET, increased the difficulty for the departure pilot to see the arrival aircraft, because of the acute angle of the RET.

The Decision to Delay the Runway Inspection

The collision occurred near the taxiway D intersection which was at about the 11 o'clock direction from the tower building (see figure 1 for the aerodrome layout). The Medan Tower controller was unable to clearly observe the collision, since the impact point was on the right side of the IW1252 and might have been obstructed by the IW1252 fuselage.

The collision resulted in damage to the left wing of JT197 aircraft, and the right wing and nose section of IW1252. Debris was scattered on the runway including the detached section of the right wing of IW1252 approximately 2.8 meters in length.

After the collision, the JT197 pilot informed Medan Tower controller of another aircraft on the runway when JT197 landed. The Medan Tower supervisor on duty noticed two aircraft on the runway and the Medan Tower controller panicked. Thereafter, the Medan Tower supervisor took over the communications on Medan Tower. The existing of two aircraft on the runway and the panic of the Medan Tower controller indicated that unusual condition had occurred.

The Medan Tower controller issued take off clearance to the IW1252 pilot which was rejected, and the pilot requested to return to apron to inspect the possibility of the aircraft damage. The pilots of JT197 and IW1252 did not report that a collision had occurred.

At 04:07:21 UTC, after the IW1252 vacated the runway, the Medan Tower supervisor issued takeoff clearance for other departure aircraft. This indicated that the Medan Tower supervisor was not aware of the collision, including the debris on the runway.

The condition of two aircraft on the runway and the departure aircraft requesting to return to apron for inspection for possible damage did not trigger the Medan Tower supervisor to seek further information of possibility of an aircraft collision.

At 04:08:55 UTC, the JT197 pilot advised the Medan Ground controller the possibility of aircraft debris on the runway that might become hazard to the other aircraft. The Medan Ground controller acknowledged this and relayed the information to the Medan Tower supervisor.

At 04:10:26 UTC, the other departure pilot after airborne advised to the Medan Tower supervisor that there were FOD on the runway.

At 04:10:44 UTC, the Medan Tower supervisor issued landing clearance to other arriving aircraft.

Two pilots had informed the Medan Tower supervisor of debris on the runway, who then informed the Airport Runway and Accessibility unit. While waiting for the runway to be inspected, other arriving aircraft landed.

At 0431 UTC, the Medan Tower controller closed the runway operation for runway inspection.

The ATS SOP subchapter 13.1.5 requires if there is any doubt of the safety on the movement area, the air traffic control shall ask the Airport Runway and Accessibility unit to inspect the uncertain area. The air traffic control shall delay the departure and arrival aircraft until the inspection result indicated that the movement area is safe for operation especially when there is Foreign Object Debris (FOD) as a result of unusual aircraft operation.

The decision to delay the runway inspection as result of the uncertain condition following a possible aircraft collision, was not in accordance with the ATS SOP. The information from two pilots of debris on the runway which indicated hazard on the runway did not trigger the Medan Tower controller to immediately close the runway operation.

Air Traffic Controller Competency in Unusual Condition

The Medan Tower controller and supervisor received a training to handle unusual/emergency situation during their studies at aviation college.

In order to ensure all air traffic controller follows the standard requirement in the SOPs and maintained their competency, the AirNav Indonesia branch Medan conducted a performance check every six months, as part of requirement to maintain air traffic control rating. The check was performed through a theoretical and practical check.

The last performance check did not discussed the requirement of ATS SOP subchapter 13.1.5 related to the procedure in the event of an unusual condition. The last practical check was performed in a real situation by examining air traffic controller performing the daily duty to control air traffic on the working shift. There was no simulation of handling an unusual aircraft operation.

The last simulation of unusual aircraft operation for the Medan Tower supervisor was in 2005 while the Medan Tower controller was in 2015. These were conducted while studying to become an air traffic controller in aviation college.

The investigation could not find any documentation that indicated the Medan Tower supervisor or controller had rehearsed to handle an unusual condition.

Unusual conditions are rare, and an air traffic controller may not experience these during the daily operations. However, they should be able to handle one properly when it occurs. The information stored in the memory for a long period without any rehearsal, was very likely to be forgotten, resulting in the inability to handle an unusual condition properly.

3 CONCLUSIONS

3.1 Findings⁷

1. The pilots of JT197 and IW1252 held valid licenses and medical certificates.
2. The JT197 PIC and IW1252 pilots held valid ICAO language proficiency level 4 while the JT197 SIC held valid ICAO language proficiency level 5.
3. The air traffic controllers held valid licenses, medical certificates and ICAO language proficiency level 4.
4. JT197 and IW1252 had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). The aircraft serviceability considered not contributes to the accident.
5. JT197 received landing clearance when the IW1252 pilot was still on the Medan Ground controller frequency. This made the IW1252 pilot unaware of JT197, which was on final and had received landing clearance.
6. IW1252 was instructed to taxi to runway 23 following U2 taxi route. The IW1252 pilot requested to depart from intersection taxiway D, which was Rapid Exit Taxiway (RET), with intention of expediting the departure since the flight was delayed. This was approved by Medan Tower controller.
7. The approval to takeoff from the runway intersection upon pilot request was allowed in accordance with the ATS SOP. The issuances of conditional clearance to the departure aircraft on RET, increase the difficulty for the departure pilot to see the arrival aircraft because of the acute angle of the RET.
8. The investigation could not find a procedure for air traffic control to give precaution regarding use of the RET for departure aircraft, especially when the departing aircraft is to follow and arrival aircraft which required a conditional clearance.
9. The PF advised to the Medan tower controller that the aircraft was ready for departure during taxi. This might be an indication that the PF intended to expedite the departure as the flight had been delayed.
10. The Medan Tower controller confirmed to the IW1252 pilot whether IW1252 able for immediate departure twice, and was affirmed. The intention was to depart the IW1252 after the JT197 landed with sufficient separation to another arriving aircraft.
11. The JT197 pilots monitored the confirmation to the IW1252 pilot for immediate departure and the PF instructed the PM to advise Medan Tower controller that the JT197 was on short final. The JT197 pilot canceled the intention to advise the Medan Tower controller as the JT197 pilots heard that the clearance for the IW1252 was to enter runway after the JT197 had landed.

⁷ 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.

12. The Medan Tower controller issued a conditional clearance to IW1252 to line up behind the landing aircraft, combined with ATC route clearance. The clearance was issued faster than the recommended rate of speech described in the ICAO document 9432.
13. The conditional clearance to the IW1252 pilot was issued without confirmation whether the pilot had seen JT197 on final. This was not in accordance with the AC part 170-02 requirement.
14. The IW1252 PM, who was relatively low in experience, was unable to receive all the information of the clearance that was delivered faster than the requirement. The IW1252 PM readback only the last sentence of the clearance without correction from the Medan tower controller.
15. The Medan Tower controller could not recall any previous pilot misunderstanding while issuing a conditional clearance. Even though the readback was incomplete, the Medan Tower controller assumed that the pilot had acknowledged the clearance properly and the immediate action to correct the discrepancies of the pilot readback was considered unnecessary.
16. The procedure to issue conditional clearance in the ATS SOP of the AirNav Indonesia branch Medan did not describe in detail the requirement stated in the AC part 170-02. The ATS SOP referred to the ICAO Document 4444 for the example of the phraseology and the detailed the requirements of conditional clearances.
17. The Medan Tower controller had been trained in the requirement to use the conditional clearance when studying to become an air traffic controller in aviation college in 2015. The investigation could not find any documentation that indicated that the conditional clearance requirement had been rehearsed by the Medan Tower controller since this time.
18. The Medan tower controller advised another arriving aircraft that IW1252 would depart. This was intended to make the other arriving aircraft pilot aware that IW1252 would depart between when JT197 landed and their own expected landing clearance. This transmission might have made the IW1252 pilot believe that they were number one in the sequence, as they did not hear the other communications, and were not aware of that JT197 was on final.
19. The ATS SOP subchapter 7.1.1.4 requires aerodrome/tower controller to maintain continuous watch on all flight operations on and in the vicinity of an aerodrome. The movement of IW1252 was not monitored by the Medan Tower controller due to the controller's other activities in controlling the other arriving aircraft, and the controller's assumption that the IW1252 pilot had acknowledged the clearance to line up after JT197 landing.
20. The IW1252 pilots assuming that they had clearance to enter the runway 23 for departure caused by combination of several conditions.
21. Passing 37 feet, the PM of JT 197 advised to the PF of the position of IW1252, which had crossed the runway holding position marking (yellow line). The distance between these two aircraft was approximately 643 meters. This might be the first time the JT197 pilots recognized that IW1252 was continuing taxi on to the runway.

22. Taking into account an expected height loss shortly after a go-around is initiated, a go around executed as the aircraft was descending through 37 feet would most likely not have avoided the collision. Additionally, the time it took for the PM to advise the PF of the position of IW1252 may have resulted in further delays in initiating the go-around. Therefore, initiation of a go-around from 37 feet, may have resulted in more severe circumstances.
23. Three seconds after touchdown, the JT197 pilot turned the aircraft to 2° to the right. The pilot decision to move away from the runway centerline avoided a centerline collision, however the wing collision was unavoidable. The wing collision was less severe compared to an aircraft collision on the runway centerline.
24. At 04:00:56 UTC, both CVRs of the aircraft recorded the impact sound and it was the left wing of JT197 that collided with the right wing of the IW1252.
25. The collision occurred near the taxiway D intersection and was at about the 11 o'clock direction from the tower building. The Medan Tower controller was unable to clearly observe the collision, since the impact point was on the right side of the IW1252 which might have been obstructed by the IW1252 fuselage.
26. The information of debris on runway was informed to the Medan Ground controller by the JT197 pilot, and to Medan Tower supervisor by another departure aircraft pilot. Afterwards, one aircraft landed on runway 23 and then the runway was closed for debris removal.
27. The ATS SOP subchapter 13.1.5 requires any doubt of the safety on the movement area, the air traffic control shall ask the Airport Runway and Accessibility unit to inspect the uncertain area. The air traffic control shall delay the departure and arrival aircraft until the inspection result indicated that the movement area is safe for operation especially when there is Foreign Object Debris (FOD) as a result of unusual aircraft operation.
28. The last simulation of handling of and unusual aircraft operation for the Medan Tower supervisor was conducted in 2005, while the Medan Tower controller was in 2015 when they studied to become an air traffic controller in aviation college. The last performance check in AirNav Indonesia branch Medan did not discuss unusual conditions and conditional clearance requirements. The information that has stored in the memory for long period without any rehearsal was very likely to be forgotten.
29. The inappropriate use of the procedure related to conditional clearance without correction, might have made the controller believe that the procedure was correct. The absence of a detailed of requirements for conditional clearance in the ATS SOP most likely made the controller overlook the requirement.
30. Unusual conditions are rare, and an air traffic controller may not experience these during the daily operations. However, they should be able to handle one properly when it occurs. The information stored in the memory for a long period without any rehearsal, was very likely to be forgotten, resulting in the inability to handle an unusual condition properly.

31. The ICAO Document 9432, an air traffic control (ATC) route clearance is not an instruction to take off or enter an active runway. The words “TAKE OFF” are used only when an aircraft is cleared for take-off, or when cancelling a take-off clearance. At other times, the word “DEPARTURE” or “AIRBORNE” is used.

3.2 Contributing Factors⁸

The communication misunderstanding of the conditional clearance to enter runway while the IW1252 pilots did not aware of JT197 had received landing clearance and the unobserved IW1252 aircraft movement made the IW1252 aircraft entered the runway.

⁸ Contributing factors is defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability. (Refer to ICAO Doc 9756 Part IV).

4 SAFETY ACTION

At the time of issuing this report, the Komite Nasional Keselamatan Transportasi had been informed of safety actions taken by the AirNav Indonesia branch office Medan and the PT. Wings Abadi Airlines resulting from this occurrence.

4.1 AirNav Indonesia Branch Office Medan

On 7 August 2017, issued circular to all air traffic controllers number CBKO.EDR.001/04/LPPNPI/08/2017 which contained the following instructions:

- Prohibit aircraft takeoff from Rapid Exit Taxiway (RET) intersection.
- Ensure Medan Tower controller to maintain continuously watch of all aircraft in vicinity of aerodrome.
- Avoid to give prolong instruction and clearance.
- Avoid the use of conditional clearance of “behind landing aircraft”.
- Shall readback and hear back every instruction and clearance.
- Shall implement the Standard Operation Procedure (SOP) of the Air Traffic Service (ATS).
- Shall familiar and implement procedure for handling emergency or abnormal situation.
- The ATC supervisor and ATS coordinator shall intensify their operational supervision.
- Improve the safety awareness.
- Prohibit the use of cellular phone during the duty.

On 6 September 2017, amended the ATS SOP to include the requirement for air traffic controller to issue the clearance at recommended rate and clearly.

Responding to the KNKT safety recommendation in the preliminary report, the AirNav Indonesia branch Medan conducted the following corrective actions:

- On 6 September 2017, the ATS SOP was amended to include conditional clearance requirement described in the AC170-02 and the ICAO Document 9432;
- On 8 and 11 September 2017 conducted safety briefing to all air traffic controllers regarding the ATS SOP amendment of the conditional clearance requirement, refreshed the readback requirement contained in the ATS SOP and refreshed the coordination procedure contained in the ATS operation agreement with the Airport Runway and Accessibility unit especially the coordination to mitigate hazard on runway.

On 26 October 2017, the AirNav Indonesia branch office Medan developed Unusual Condition Module for Air Traffic Controller as guidelines to operation personnel.

4.2 PT. Wings Abadi Airlines (Wings Air)

On 3 August 2017, issued notice to pilot number 42/NTP/OMIW/VIII/2017 which contained the following instruction:

- To keep Airmanship and Situational Awareness at high level in all phase of flight.
- Sterile Cockpit Procedures are implemented to ensure communications to or from the cockpit as well as communications within the cockpit are restricted to safety and operational related communications to avoid distracting the flight crew from full attention to aircraft maneuver and performance.
- All ATC clearance must be fully understood by both pilots before readback. If any doubt must be reconfirmed to ATC.

On 5 August 2017, issued notice to pilot number 44/NTP/OMIW/VIII/2017 which contained the following instruction:

- Always (whenever possible) depart from the end of departure runways. Always avoid (whenever possible) depart from intersections.
- Always make a good look-around prior to entering or crossing runways.
- Always make a good listening, good understanding and good monitoring to ATC instructions.

On 7 September 2017, the Wings Air inserted lack of communication issue in the safety bulletin August edition.

4.3 PT. Lion Mentari Airlines (Lion Air)

On 18 August 2017, the Lion Air issued recommendation to pilot number 10/SS/SR/VIII/2017 with subject of Runway Incursion That Leads to Ground Collision. The recommendation remains to all pilots:

- Create a good cross cockpit communication, make sure an clearance from the ATC have been correctly read back and passed on to the other crew member (cross communication).
- Maintain good listening-watch to increase situational awareness especially position of other traffic.
- To increase safety awareness prior entering runway. If in doubt, do not hesitate to stop the aircraft and ask the ATC to repeat the clearance.
- During night time or limited visibility, use all the exterior lights.
- Rush is not an option in every condition, make sure procedure completed.
- Make sure that all checklists have been completed before entering active runway.

5 SAFETY RECOMMENDATIONS

The KNKT acknowledged the safety actions taken by the related parties, there still remain safety issues that need to be considered. Therefore, the KNKT issues the following safety recommendations addressed to the AirNav Indonesia.

- **04.A-2017-25.6**

Hazard may exist for departure aircraft from Rapid Exit Taxiway (RET) especially when requires conditional clearance to line up behind landing aircraft as the difficulty for departure pilot to see arrival aircraft. The investigation could not find procedure for air traffic control to give precaution when use the RET for departure aircraft. In addition, the precautions to use RET for departure also never been mentioned as hazard during the daily operation in Medan prior to the occurrence.

The KNKT recommends to ensure air traffic controllers consider the possible hazard when using RET for departure aircraft.

- **04.A-2017-25.7**

The requirement to issue conditional clearance in the ATS SOP of the AirNav Indonesia branch Medan addressing the ICAO Document 4444 and not describes the procedure in detail. This existing manual requires air traffic controller to refer to another manual to have complete understanding of procedure. Even though the procedure has been amended after the occurrence, there was a possibility of the same issue to the other requirements which may lead to air traffic controller overlook to the detail requirement.

The KNKT recommends to review the ATS SOP to include detail procedure or guideline for air traffic controller.

- **04.A-2017-25.8**

Unusual conditions are rare, and an air traffic controller may not experience these during the daily operation. However, they should be able to handle one properly when it occurs. In addition, the performance check did not include simulation of handling of unusual aircraft operation to rehears the training in the aviation college. The absence of rehearsal might have made procedure to handle unusual conditions were very likely to be forgotten, resulting in the inability to handle an unusual condition properly.

The KNKT recommends to review the performance check or other methods of maintaining air traffic controller competency to ensure the air traffic controller ability to handle unusual condition of aircraft operation.

6 APPENDICES

6.1 Circular number CBKO.EDT.001/04/LPPNPI/08/2017 (AirNav Indonesia Branch Office Medan)



AirNav Indonesia

PERUM LPPNPI
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1. Personil ATC;
2. Supervisor ATC;
3. ATS Operation Coordinator.

EDARAN

NOMOR : CBKO.EDR.001/04/LPPNPI/08/2017

TENTANG


Rekomendasi Keselamatan Kejadian Runway Incursion LNI197 (B739/PK-LJZ) Dengan WON1252 (ATR72/PK-WFF) Tanggal 03 Agustus 2017 di Unit ATS Medan

1. Mengacu pada arahan Direktur Operasi Perum LPPNPI, perihal Runway Incursion WON1252 dan LNI197 tanggal 03 Agustus 2017 di Bandara Internasional Kualnamu.
2. Terkait butir 1 (satu) tersebut di atas, disampaikan kepada seluruh personil ATC, Supervisor ATC dan ATS Operation Coordinator untuk dapat melakukan hal-hal sebagai berikut:
 - a. Para ATC untuk tidak mengizinkan pesawat take off dari intersection **Rapid Exit Taxiway / RET** karena pada posisi tersebut, pilot yang akan take off tidak dapat melihat final area.
 - b. ATC Tower dalam memandu pesawat **wajib** melihat dan memperhatikan vicinity of aerodrome (runway, taxiway, final downwind, base leg if any, dan apron apabila pelayanan saat ini masih diberikan oleh ATC, meskipun untuk pergerakan di Apron menjadi tanggung jawab AMC).
 - c. Hindari pemberian instruksi yang panjang (instruksi borongan) kepada Pilot (karena hazard / sulit di read back dan mengurangi konsentrasi Pilot).
 - d. Hindari phraseology after traffic on final landing passing line up behind (terlalu panjang dan dapat menyebabkan misunderstanding apalagi kalau instruksi lebih dulu dari informasi), gunakan saja.....hold on short.
 - e. Read back dan hear back **wajib** dilakukan.
 - f. Agar semua Crew ATS pelajari dan pahami SOP dan wajib direview bila sudah tidak sesuai dengan kondisi lapangan saat ini (Manajemen dan ATC Koordinator, Supervisor dan Pelaksana bersama-sama mereview SOP maupun LOCA).
 - g. Para ATC aktif (Pelaksana, Supervisor dan Koordinator), wajib mengetahui memahami dan menguasai prosedur emergency / abnormal situation (agar apabila terjadi kondisi tersebut para ATC dapat menanganinya dengan baik dan safety tetap terjaga).
 - h. Para Supervisor wajib ketat dalam mengawasi pelayanan lalu lintas penerbangan (terutama kepada para ATC yang baru rated) dan dapat mengelola para pelaksana dibawah tanggung jawabnya dalam shiftnya.


- i. Para ATS/ATC Koordinator wajib melakukan pengawasan operasional dengan observasi langsung ke unit-unit operasional dan tetap melaksanakan safety briefing kepada para Supervisor / Pelaksana sebelum dinas setiap shift.
 - j. Tanamkan Safety Culture agar para ATC tetap memiliki Safety Awareness yang tinggi dan dapat mengidentifikasi hazard serta memitigasi hazard (Manager K3LK dan jajaran secara continue/berkala membantu dan memberikan sosialisasi bagaimana mengidentifikasi dan memitigasi hazard yang ada serta lebih ketat mengawasi jalannya operasional).
 - k. General Manager dan jajarannya agar mengacak frekuensi/sinyal telepon seluler / hp di Tower, APP, FSS agar tidak dapat digunakan untuk berkomunikasi menggunakan hp dan sediakan locker tempat menyimpan hp.
 - l. Proses koordinasi antara Tower dan APP dilakukan sesuai prosedur / SOP dan harus jelas diterima keduanya (terutama ketika change runway maupun abnormal situation).
 - m. Pastikan para ATC tidak terpancing oleh pernyataan ataupun permintaan pilot namun tetap berdasarkan prosedur/separasi standard dalam memandu lalu lintas penerbangan.
 - n. Saat pergantian shift, agar dilakukan dalam waktu yang cukup, sesuai SOP dan transfer of control **wajib** dilakukan sesuai standard.
 - o. Agar para General Manager membuat usulan pemasangan CCTV disemua ruang control, untuk pengawasan dan kepentingan evaluasi kerja.
3. Demikian Surat Edaran ini dibuat untuk dapat dilaksanakan dengan sungguh-sungguh.

Dikeluarkan di : Deli Serdang
Pada Tanggal : 07 Agustus 2017

6.2 Notice to Pilot Number 42/NTP/OMIW/VIII/2017 (Wings Air)

	NOTICE TO PILOT		
	NOTICE NUMBER	42/NTP/OMIW/VIII/2017	
	DATE OF ISSUED	3 August 2017	
RUNWAY INCURSION PREVENTION	APPLICABILITY	ALL PILOT	
	DATE OF EFFECTIVENESS	4 August 2017	
	DISTRIBUTION LIST	DO	SSQ
OMPATR		OT	
<p>Dear Pilots,</p> <p>This is to inform you about Accident happened on Thursday 3 August 2017 at 0350 UTC in Kuala Lumpur Airport (KLC) involving PK-WFF ATR 72-600.</p> <p>The runway incursion occurred when PK-WFF was taxiing to line up Runway 23. During lining up, another traffic was commencing landing on the same runway which resulted in collision of both aircrafts.</p> <p>Both aircraft suffers major damage on the wing area, due to collision of each other's wing tip.</p> <p>This notification is also to remind all Pilot :</p> <ol style="list-style-type: none"> 1. To keep Airmanship and Situational Awareness at high level in all phase of flight. 2. Sterile Cockpit Procedures are implemented to ensure communications to or from the cockpit as well as communications within the cockpit are restricted to safety and operational related communications to avoid distracting the flight crew from full attention to aircraft manoeuvre and performance (OMA 8.3.1.4). 3. All ATC Clearance must be fully understood by both Pilot before read back. If any doubt must be reconfirmed to ATC (OMA 8.3.3.2.3) <p>Fly Safe !</p>			

6.3 Notice to Pilot Number 42/NTP/OMIW/VIII/2017 (Wings Air)

	NOTICE TO PILOT			
	NOTICE NUMBER	44/NTP/OMIW/VIII/2017		
	DATE OF ISSUED	05 August 2017		
DEPART FROM THE END OF DEPARTURE RUNWAYS	APPLICABILITY	ALL WINGS AIR PILOTS		
	DATE OF EFFECTIVENESS	06 August 2017		
	DISTRIBUTION LIST	DO	DS	SSQ
		OMPATR	OR	OT
<p>Dear Pilots,</p> <p>Based on incident on Thursday, August 3rd, 2017 in Kulanamu International Airport involving Wings Air's ATR 72-500 PK-WFF and Lion Air's Boeing 737, it is <u>STRONGLY RECOMMENDED</u> to all Wings Air Pilots to:</p> <ol style="list-style-type: none"> 1. Always (whenever possible) depart from the end of departure runways. Always avoid (whenever possible) depart from intersections. 2. Always make a good look-around prior to entering or crossing runways. 3. Always make a good listening, good understanding and good monitoring to ATC instructions. <p>Fly safe!</p>				

6.4 Wings Air Safety Bulletin – August 2017 Edition



PUBLICATION DEPARTMENT

SSQ
BULLETIN

AUGUST 2017

WA-DCTP-04-REV00-01 FEB 2017

SAFETY ISSUE



COMMUNICATION

Lack of Communication is a failure to ensure the mental picture match, between verbal information from external and visual information from internal.

For example: I have a mental picture from verbal information that comes from me as PIC from ATC such as traffic takeoff/landing, FOD in runway, Runway condition, etc. If you have the same mental picture at the end of your conversation then a proper communication has occurred (effective communication).

Many times in Aviation and in other areas of our life, we have conversations with other people and we assume that we understand the meaning 100%, but the sad truth is that only 33% of the average conversation is totally understood. It leaves a whopping 67% of our misunderstanding conversation.

SSQ BULLETIN | August 2017

Lack of Communication among Top Human Errors



A study done by Albert Mehrabian on how a message is transmitted and received in average conversation. Revealed that 55% of the message is transmitted by body language, 38% by tone of voice and an unbelievable 7% verbally. **With only 7% verbal communication maybe now you can start to see how human errors can be occurred and why do we consider Lack of Communication to be one of the top 4 human errors.**

When we make verbal communication with ATC by radio in condition no one see each other, there are many communication barriers between cockpit crews and ATC; noise, heat stress, rush in cockpit, weather, pronunciation, dialect - all of them could reduce the contain of message or information.

Is there a secret to good communication? You have:

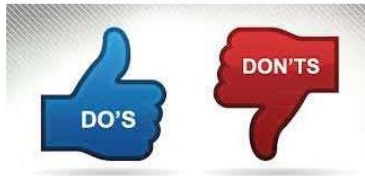
- Two ears
- Two eyes
- A mouth

You MUST try to remember to use them in that order and proportion.

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Some things you should do:

1. **Listen more and talk less:** Monitor all traffic ahead by your ears (four ears in cockpit).
2. **Think before you speak:** Try to understand the message or information.
3. **Ask questions:** Confirmation to avoid misunderstanding.
4. **Paraphrase:** Make sure internal environment cockpit before start communication.
5. **Make eye contact:** Visual contact with traffic by monitoring TCAS or look around.
6. **Use positive body language:** In direct communication such as communication between PIC and FO.
7. **Do whatever it takes to make sure the "mental pictures" match:** To ensure all picture in your head, you must process by combine each external information with internal information.



Some things you shouldn't do:

1. **Don't Detour:** To detour is to change the subject being discussed. Work on keeping the conversation on the topic being discussed.
2. **Don't Preplan:** The problem with preplanning is you are busy working on a response instead of listening to what is being said.
3. **Don't Tune Out:** If you tune things out, you don't hear what is being said.

Top 5 tips for increasing your situational awareness when made communication with controller:

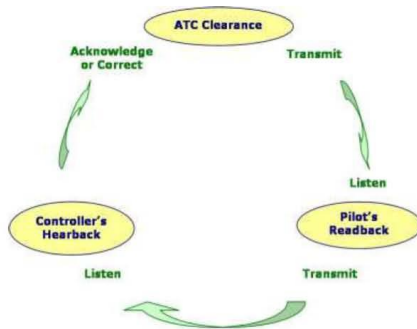
1. Do not read back a clearance.
2. Check R/T if there is a prolonged break in activity on the frequency.
3. When reading back a conditional clearance, state the condition first.
4. Set the clearance given, not the clearance expected.
5. If you are unsure, **always check**.

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ICAO Annex 11 requires that the safety-related part(s) of any clearance or instruction be read back by the pilot to the controller.

The following parts of a clearance shall always be read back:

- ATC route clearances
- Clearances and instructions to enter, land, take off, hold short of, cross or backtrack on a runway
- Runway in use
- Altimeter setting
- ATC transponder code
- Altitude or flight level instructions
- Heading and speed instructions
- Transition levels (whether issued by the controller or broadcast by the automatic terminal information system ATIS)



The pilot's read back must be completed and cleared to ensure a complete and correct understanding by the controller.


The read back message shall always include the flight call sign.

Read back of a short hold, crossing, takeoff or landing instruction shall always include the runway designator.

The use of the term "roger" is unacceptable read back as it does not allow the controller to confirm or correct the clearance or instruction, thus decreasing the pilot's and the controller's situational awareness.

- A pilot may use "roger" to acknowledge a message containing numbers (instead of a normal read back), thus preventing effective hear back and correction by the controller, or
- A controller may use "roger" to acknowledge a message requiring a specific answer (e.g., a positive confirmation or correction, such as acknowledging a pilot's statement that an altitude or a speed restriction cannot be met).

6.5 Recommendation to Pilot (Lion Air)

	SAFETY AND SECURITY DIRECTORATE	10/SS/SR/VIII/2017
	RECOMMENDATION	[18/08/2017]

Issued date:	August 18 th 2017
Applicability:	All Pilots, Chief Pilot
Distribution list:	DO, Deputy DO, Corp. Safety
Prepared by:	FDA Team
Verified by:	SF
Approved by:	DS
Subject:	Runway Incursion That Leads to Ground Collision



Dear All Pilots,

On 3 August 2017, an aircraft experienced ground collision with other aircraft during landing roll at Kualanamu International Airport (WIMM/KNO). One aircraft cleared to land and the other aircraft entered the active runway. That occurrence resulted in substantial damage on their aircrafts wings.

Following that occurrence, Lion Air's Safety and Security Directorate would like to remain to all pilots:

- Create a good cross cockpit communication, make sure all clearance from the ATC have been correctly read back and passed on to the other crew member (cross communication).
- Maintain good listening-watch to increase situational awareness especially position of other traffic.
- To increase safety awareness prior entering runway. If in doubt, do not hesitate to stop the aircraft and ask the ATC to repeat the clearance.
- During night time or limited visibility, use all the exterior lights.
- Rush is not an option in every condition, make sure procedure completed.
- Make sure that all checklist has been completed before entering active runway.

Thank you for your attention and co-operation and have a safe flight

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6.6 Direct Involve Parties Draft Report Comments

6.6.1 PT. Lion Mentari Airlines

No	Reference Chapter, Page, Paragraph	Proposed Amendment	Reason For Proposed Change	Remarks								
1.	1.5.1 Pilot Information of JT197	<table border="1"> <tr> <td>Flying experience</td> <td></td> </tr> <tr> <td>Total hours</td> <td>2,300 8,200 hours</td> </tr> </table>	Flying experience		Total hours	2,300 8,200 hours	Correction of total flying hours	Accepted				
Flying experience												
Total hours	2,300 8,200 hours											
2.	1.7 Meteorological Information	<table border="1"> <tr> <td></td> <td>0330 UTC</td> <td>0400 UTC</td> <td>0430 UTC</td> </tr> <tr> <td>Weather</td> <td>Cloudy</td> <td>Cloudy</td> <td>Cloudy</td> </tr> </table>		0330 UTC	0400 UTC	0430 UTC	Weather	Cloudy	Cloudy	Cloudy	The weather “cloudy” should use the standard phraseological based on Jeppesen.	The meteorological information on the final report has been changed. This comment is still referred to the meteorological information of preliminary report.
	0330 UTC	0400 UTC	0430 UTC									
Weather	Cloudy	Cloudy	Cloudy									
3.	1.10 Aerodrome Information	Runway direction : 05/23 (045° 046° / 225° 226°)	According to the aerodrome chart published by Jeppesen on 11 April 2014 the runway direction was 05/23 (046° / 226°).	Accepted Refer to AIP Indonesia (Vol. II) Aerodrome Chart – ICAO WIMM AD 2.24-1 Amendment 41.								
4.	1.16 Test and Research	Please define the scopes and purposed of Test and Research, because in the report there was not mentioned who has not done		Rejected								

No	Reference Chapter, Page, Paragraph	Proposed Amendment	Reason For Proposed Change	Remarks
		the Test and Research.		
5.	3.1 Findings	Please put ICAO Language Proficiency level of the pilots.		Accepted

6.6.2 Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation (BEA France)

No	Reference Chapter, Page, Paragraph	Proposed Amendment	Reason For Proposed Change	Remarks																
1.	1.11.2 Cockpit Voice Recorder	<table border="1"> <thead> <tr> <th>UTC</th> <th>RECORDED on JT197 CVR</th> </tr> </thead> <tbody> <tr> <td>03:59:41</td> <td>EGPWS RAD ALT altitude callout "ONE THOUSAND".</td> </tr> <tr> <td>04:00:15</td> <td>EGPWS RAD ALT altitude callout "FIVE HUNDRED".</td> </tr> <tr> <td>04:00:23</td> <td>EGPWS RAD ALT altitude callout "FOUR HUNDRED".</td> </tr> <tr> <td>04:00:29</td> <td>EGPWS RAD ALT altitude callout "THREE HUNDRED".</td> </tr> <tr> <td>04:00:36</td> <td>EGPWS RAD ALT altitude callout "TWO HUNDRED".</td> </tr> <tr> <td>04:00:42</td> <td>EGPWS RAD ALT altitude callout "ONE HUNDRED".</td> </tr> <tr> <td>04:00:45</td> <td>EGPWS RAD ALT altitude callout "FIFTY".</td> </tr> </tbody> </table>	UTC	RECORDED on JT197 CVR	03:59:41	EGPWS RAD ALT altitude callout "ONE THOUSAND".	04:00:15	EGPWS RAD ALT altitude callout "FIVE HUNDRED".	04:00:23	EGPWS RAD ALT altitude callout "FOUR HUNDRED".	04:00:29	EGPWS RAD ALT altitude callout "THREE HUNDRED".	04:00:36	EGPWS RAD ALT altitude callout "TWO HUNDRED".	04:00:42	EGPWS RAD ALT altitude callout "ONE HUNDRED".	04:00:45	EGPWS RAD ALT altitude callout "FIFTY".	Correction of EGPWS term.	Rejected This subchapter discuss about CVR data while the RAD ALT available on the FDR.
		UTC	RECORDED on JT197 CVR																	
		03:59:41	EGPWS RAD ALT altitude callout "ONE THOUSAND".																	
		04:00:15	EGPWS RAD ALT altitude callout "FIVE HUNDRED".																	
		04:00:23	EGPWS RAD ALT altitude callout "FOUR HUNDRED".																	
		04:00:29	EGPWS RAD ALT altitude callout "THREE HUNDRED".																	
		04:00:36	EGPWS RAD ALT altitude callout "TWO HUNDRED".																	
		04:00:42	EGPWS RAD ALT altitude callout "ONE HUNDRED".																	
04:00:45	EGPWS RAD ALT altitude callout "FIFTY".																			

No	Reference Chapter, Page, Paragraph	Proposed Amendment		Reason For Proposed Change	Remarks
		04:00:46	<ul style="list-style-type: none"> The JT197 PM advised to the PF of the IW1252 position which close to the runway. EGPWS RAD ALT altitude callout “FORTY”. 		
		04:00:47	EGPWS RAD ALT altitude callout “THIRTY”.		
		04:00:48	EGPWS RAD ALT altitude callout “TWENTY”.		
		04:00:49	<ul style="list-style-type: none"> The JT197 PM re-advised to the PF of the IW1252 position which close to the runway EGPWS RAD ALT altitude callout “TEN”. 		

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