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NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Serious Incident Investigation Report

SilkAir PTE LTD

A319-133; 9V-SBH

Adi Soemarmo International Airport

Solo, Central Java

Republic of Indonesia

6 March 2012



NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2013

This Final Report was produced by the National Transportation Safety Committee (NTSC), 3rd Floor Ministry of Transportation, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the NTSC 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. 3/2001).

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ABBREVIATIONS AND DEFINITIONS

AAIB	:	Air Accident Investigation Bureau
AGL	:	Above Ground Level
AOC	:	Air Operator Certificate
ARFF	:	Airport Rescue and Fire Fighting
ATC	:	Air Traffic Control
ATIS	:	Aerodrome Terminal Information Services
ATPL	:	Air Transport Pilot License
ATS	:	Air Traffic Service
BMKG	:	<i>Badan Meteorologi Klimatologi dan Geofisika</i> (Metrological Climatology and Geophysical Agency)
°C	:	Degrees Celsius
CAM	:	Cockpit Area Microphone
CASR	:	Civil Aviation Safety Regulation
Cm	:	Centimeter(s)
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
DME	:	Distance Measuring Equipment
FDR	:	Flight Data Recorder
ft	:	Feet
Hrs	:	Hours
ICAI	:	Indonesian Civil Aviation Institute
ICAO	:	International Civil Aviation Organization
IIC	:	Investigator in Charge
ILP	:	ICAO Language Proficiency
ISE	:	In Service Experience
JATC	:	Junior Air Traffic Controller
kts	:	Knots (nm/hours)
MSN	:	Manufactured Serial Number
Nm	:	Nautical mile(s)
NOTAM	:	Notice to Airman
KNKT (NTSC)	:	<i>Komite Nasional Keselamatan Transportasi</i> (National Transportation Safety Committee)
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring

SATC : Senior Air Traffic Controller
S/N : Serial Number
SSCVR : Solid State Cockpit Voice Recorder
SSFDR : Solid State Flight Data Recorder
TSN : Time since New
UTC : Universal Time Coordinate
VLP : Visual Control Post
VOR : Very High Frequency Omnidirectional Range

INTRODUCTION

SYNOPSIS

On 6 March 2012, an Airbus A319 aircraft registered 9V-SBH, operated by SilkAir on a schedule passenger flight as SLK 112. The aircraft departed from Changi Airport (WSSS), Singapore to Adi Soemarmo Airport (WARQ), Solo Indonesia.

There were 131 persons on board, consisted of two pilots, five cabin crews, and 124 passengers (120 adult and 4 children).

The brake assembly number 2 was replaced at the night stop before departed to Solo.

The aircraft landed at 0158 UTC. During landing roll, the controller observed smoke on the left main landing gear and informed to the SLK pilot. The controller communicated in unclear English. The communication was assisted by the pilot of another aircraft by translating to and from Indonesia and English.

For five minutes the pilot repeatedly asked Marmo Tower for more information to find out whether there was smoke and/or fire. At 0204 UTC, Marmo Tower said to the pilot that there was fire and the pilot made decision to conduct passenger emergency evacuation between the taxiway Bravo and apron.

The passengers disembarked using emergency slides and one of the passengers had a minor injury.

The investigation found no evidence that there had been fire.

The investigation found that the controllers were not eligible to conduct duty as controller.

Following this investigation the NTSC issued several recommendations to the DGCA and PT Angkasa Pura I/ Air Navigation Indonesia to address identified safety issues.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 6 March 2012, an Airbus A319 aircraft, registered 9V-SBH, was being operated by SilkAir on a schedule passenger flight as SLK 112. The aircraft departed from Changi International Airport (WSSS), Singapore to Adi Soemarmo International Airport (WARQ), Solo¹ Indonesia.

There were 131 persons on board, consisted of two pilots, five cabin crews, and 124 passengers (120 adult and 4 children).

At 0146 UTC², the pilot of the SLK 112 made first contact with air traffic controller of the Adi Soemarmo control tower controller (Marmo tower³) and received clearance for ILS approach using runway 26.

At 0156 UTC, SLK 112 reported the runway was insight and received clearance to land runway 16, the wind condition reported by Marmo Tower was 360 degrees and 7 knots.

At 0157:51 UTC, the SLK 112 landed, the Marmo Tower instructed exit runway via taxiway Bravo and continued taxi to parking stand number six. The communication between Marmo Tower and SLK 112 during the flight was clear and intelligible using standard phraseology.

The communications recorded after the aircraft landed were as follows:

- 0158:43 UTC, the Marmo Tower informed the SLK pilot in an unclear conversation that fire was observed from behind the left main landing gear of the aircraft, and there were other conversation which was not related to the controller duty on the background of the ATC controller.
- 0158:59 UTC, the SLK pilot requested to the Marmo Tower to repeat the information.
- 0159:01 UTC, the Marmo Tower explained in an unclear communication that fire was observed on the left part of the aircraft.
- 0159:15 UTC, there was a Lion Air Boeing B737 aircraft (LNI) approaching runway 26, the LNI pilot assisted to relay the message to the SLK pilot concerning smoke or maybe fire on the left landing gear.
- 0159:26 UTC, the Marmo Tower repeated in an unclear communication that there was smoke on the left side.

¹ Adi Soemarmo Airport, Solo will be named Solo for the purpose of this report.

² The 24-hour clock used in this report to describe the time of day as specific events occurred is in Coordinated Universal Time (UTC). Local time, Western Indonesian Standard Time (WIB) is UTC + 7 hours.

³ Adi Soemarmo control tower controller will be named as Marmo tower for the purpose of this report.

- 0159:44 UTC, the SLK pilot acknowledged and requested emergency services. It was approved by the Marmo Tower. The Marmo Tower pressed the crash bell and informed the fire fighter related to the emergency situation.
- 0200:09 UTC, the SLK pilot repeated the request for the emergency services to check the condition of the left side of the aircraft.
- 0200:17 UTC, the Marmo Tower instructed the SLK pilot to continue taxi to parking bay.
- 0200:21 UTC, the SLK pilot requested Marmo Tower to reconfirm the situation whether flame or smoke that was observed.
- 0200:25 UTC, the LNI pilot repeated the question of the SLK pilot in Indonesian language to Marmo Tower.
- 0200:40 UTC, the LNI pilot passed the information Marmo Tower to the SLK pilot that there was a smoke on the left main gear.
- 0200:45 UTC the SLK pilot again asked if there was spark and smoke. It was confirmed by the LNI aircraft pilot.
- 0200:52 UTC, the SLK pilot stopped the aircraft and requested for ground personnel to check the aircraft condition. The LNI pilot repeated the request to Marmo Tower in Indonesian language.
- 0201:16 UTC, the SLK pilot repeated the request to check the condition and reconfirmation on whether there was smoke, spark or fire.
- 0201:39 UTC, the LNI pilot repeated the SLK pilot's request. The Marmo Tower informed that the ground support has been informed. These conversations were in Indonesian language.
- 0201:55 UTC, the LNI pilot passed the information from the Marmo Tower to the SLK pilot.
- 0202:04 UTC, the SLK pilot requested further information of the smoke intensity.
- 0202:07 UTC, the Marmo Tower requested position of the LNI aircraft and instructed the aircraft to hold over SLO VOR.
- 0202:56 UTC, the SLK pilot requested for intensity about the smoke intensity and got replied that the fire brigade was coming to the aircraft.
- 0203:11 UTC, the SLK pilot call and Marmo tower replied "standby "one firefighting proceed to the aircraft, since this time Marmo tower controlled by assistant.
- 0203:16 UTC, the SLK pilot repeated the question related to the smoke intensity and the Marmo Tower replied that fire and smoke observed on the left main wheel.
- 0203:29 UTC, the SLK pilot asked Marmo Tower to confirm the smoke intensity and Marmo Tower replied that heavy smoke and moderate fire observed.

- 0203:36 UTC, the SLK pilot acknowledged about the fire and said intended to disembark passengers on the taxiway.
- 0203:43 UTC, the SLK pilot sought for reconfirmation of the presence of fire and the Marmo Tower replied “affirm fire”.

At 0200:01 UTC, a Visual Control Post (VCP) officer who was standing by at the briefing office requested clearance to the Marmo Tower to inspect the possibility of any foreign objects on the runway.

At 0202:42 UTC, the VCP reported that there was no foreign object on the runway and the Marmo Tower instructed the VCP to check the aircraft.

At 0204:04 UTC, the SLK pilot declared emergency and evacuated the passenger by the escape slides. One of the passengers had a minor injury during the evacuation.

There was no damage on the aircraft and other property.



Figure 1: 9V-SBH evacuation between the taxiway bravo and apron

1.2 Injures to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor/None	7	124	131	Not applicable
TOTAL	7	124	131	-

1.3 Damage to aircraft

There was no damage to the aircraft.

1.4 Other Damage

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

1.5 Personnel Information

1.5.1 Pilot in Command

Gender	:	Male
Age	:	53 years old
Nationality	:	French
Date of joining company	:	August 2007
License	:	ATPL
Date of issue	:	16 September 2005
Validity of license	:	31 May 2012
Aircraft type rating	:	A319/A320
Medical certificate	:	First Class
Last of medical examination	:	06 May 2011
Validity of medical certificate	:	31 May 2012
Medical limitation	:	None
Last proficiency check	:	26 February 2012
Flying experience		
Total hours	:	11,200 hours
Total on type	:	6,500 hours
Last 90 days	:	236 hours 9 minutes
Last 60 days	:	151 hours 41 minutes
Last 24 hours	:	2 hours 11 minutes
This flight	:	2 hours 11 minutes

1.5.2 Second in Command

Gender	:	Male
Age	:	34 years old
Nationality	:	Singaporean
Date of joining company	:	3 June 2003
License	:	ATPL
Date of issue	:	24 October 2007

Validity of license : 31 October 2012
Aircraft type rating : A319/A320
Medical certificate : First class
Last of medical examination : 22 September 2011
Validity of medical certificate : 31 October 2012
Medical limitation : None
Last proficiency check : 24 December 2011

Flying experience

Total hours : 4600 hours
Total on type : 4400 hours
Last 90 days : 137 hours 25 minutes
Last 60 days : 102 hours 27 minutes
Last 24 hours : 2 hours 11 minutes
This flight : 2 hours 11 minutes

1.5.3 Controller

Gender : Male
Age : 33 years old
Nationality : Indonesian
License : JATC
Validity of license : 01 January 2011
Medical certificate : Second Class
Last of medical examination : 28 May 2010
Validity of medical certificate : 28 May 2011
Validity of ILP certificate : 5 September 2012 (Level 4)

1.5.4 Assistant

Gender	: Male
Age	: 40 years old
Nationality	: Indonesia
License	: SATC
Validity of license	: July 2012
Rating	: TWR
Medical certificate	: Second Class
Last of medical examination	: 26 May 2010
Validity of medical certificate	: 26 May 2011
Validity of ILP certificate	: Uncertified

The assistant had examined for ICAO Language Proficiency (ILP) on 2007 and rechecked on 2008, result of examination did not attain appropriate standard level. The second examination performed on 2010 and rechecked on 2011 result of examination also did not attain appropriate standard level.

1.6 Aircraft Information

1.6.1 General

Registration Mark	: 9V-SBH
Manufacturer	: Airbus Aircraft Company
Country of Manufacturer	: France
Type/ Model	: A319 – 133
Serial Number	: 4259
Date of manufacture	: 2010
Certificate of Airworthiness	
Number	: AWC.641
Issued	: 05 April 2011
Validity	: 08 April 2012
Category	: Transport (Passenger)
Certificate of Registration	
Number	: S.358
Issued	: 25 February 2011
Time Since New	: 952 hours 19 minutes

1.6.2 Brake Assembly Number 2 (Left Hand)

Manufacturer Serial Number (MSN) : 4259
Part number : C20225508
Serial number : 04620
Cycle since installation : 1 cycle

The brake assembly number 2 was replaced at the night stop before departed to Solo.

1.6.3 Wheel Number 2 (inner left)

Part number : C20195162
Serial number : 17742

1.7 Meteorological Information

The meteorological information published from ATIS and updated every 30 minutes. At the time of the occurrence the weather reported on good condition with horizontal visibility was 3,000 m.

1.8 Aids to Navigation

Not related to the occurrence.

1.9 Communications

All communications between Marmo Tower and the crew were recorded by ground based automatic voice recording equipment and Cockpit Voice Recorder (CVR) for the duration of the flight. The qualities of the aircraft's recorded transmissions were good.

The communication between Marmo Tower and the pilot before the aircraft landed was clear and understandable with the standard phraseology.

The unclear conversations using informal daily language was recorded starting when the Marmo Tower observed smoke on the left wheels. Some parts of the communication between the SLK pilot and Marmo Tower were assisted by the pilot of another aircraft on approach to Adi Soemarmo International Airport at the time. Some of the communications between the pilot of the other aircraft and Marmo Tower were in the Indonesian language.

Other communication between Marmo Tower and VCP using local language was recorded.

1.9.1 ICAO English language proficiency requirements

Inadequate language proficiency has played a role in accidents and incidents worldwide. Both ICAO standard phraseologies and plain language are required for safe communications⁴.

ICAO grades English language performance on a scale from 6 (highest) to 1 (lowest):

- Level 6 - Expert
- Level 5 - Extended
- Level 4 - Operational
- Level 3 - Pre-operational
- Level 2 - Elementary
- Level 1 - Pre-elementary

Pilots and air traffic controllers are required to demonstrate Operational Level 4 language proficiency in the use of both ICAO phraseology and plain language.

Level 4 language enables a pilot or air traffic controller to deal adequately with apparent misunderstandings by checking, confirming, or clarifying. Proficiency below Level 4 English is generally inadequate when dealing with an unexpected turn of events.

1.10 Aerodrome Information

Airport Name	: Adi Soemarmo International Airport
Airport Identification	: WARQ
Airport Operator	: PT. Angkasa Pura I (Persero)
Coordinate	: 07° 30'49" S 110°45'02"E
Elevation	: 418 feet
Runway Direction	: 08/26
Runway Length	: 2,600 meters
Runway Width	: 45 meters
Surface	: Asphalt

The tower position is on south side of the runway (figure 2).

⁴ *Manual on the Implementation of ICAO Language Proficiency Requirements*. Doc 9835 AN/453. ICAO 2004.

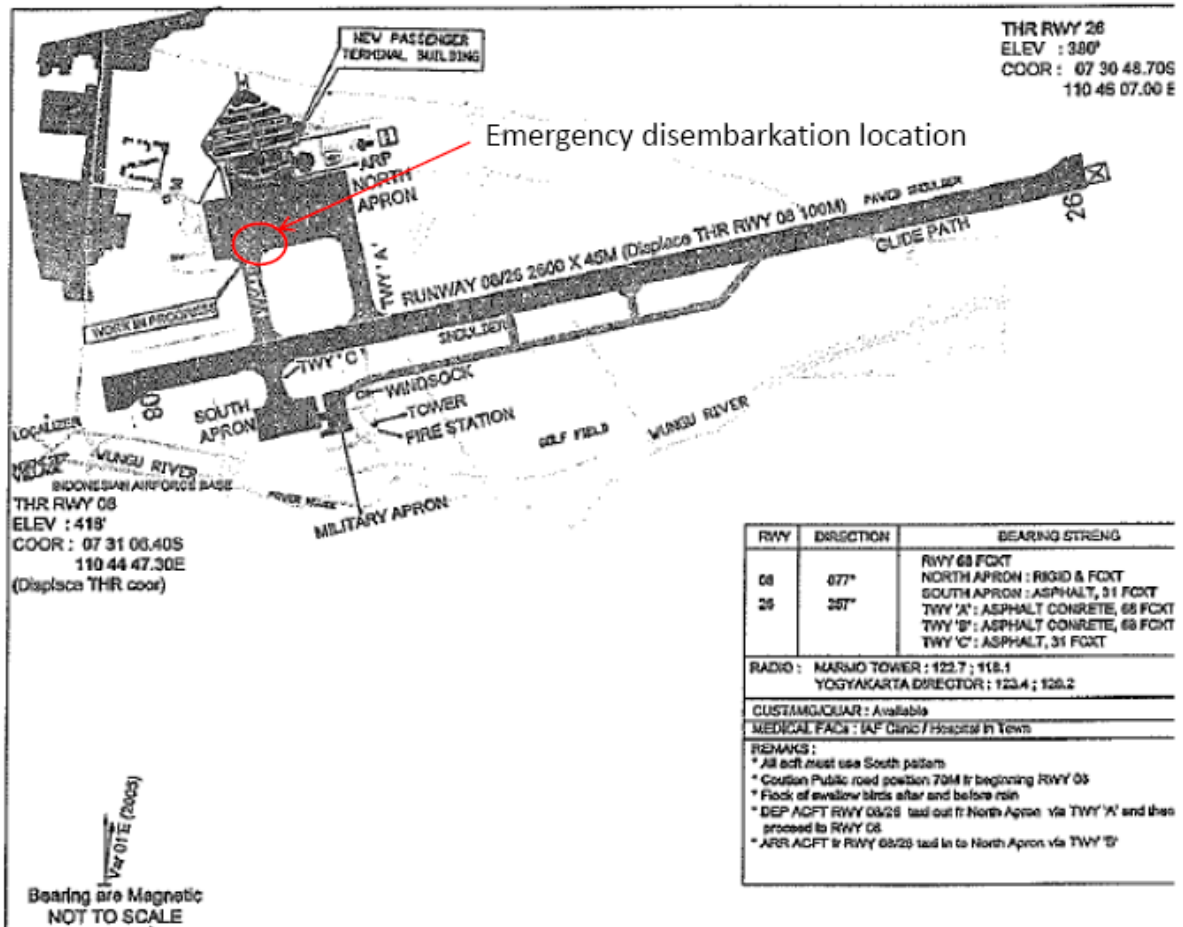


Figure 2: Aerodrome chart

1.11 Flight Recorders

The aircraft was equipped with a Solid State Flight Data Recorder (SSFDR) and a Solid State Cockpit Voice Recorder (SSCVR). The recorders downloaded at NTSC facility for further analysis.

1.11.1 Flight Data Recorder (FDR)

Manufacturer : L3 Communications
Model : FA 2100
Serial Number : 000643317
Part Number : 2100-4045-00

The FDR data was downloaded by the NTSC at its facility and contained 449 parameters for the 250 flight hours.

All of the parameters were successfully downloaded and processed. The FDR data considered not relevant and was not analyzed for the purpose of this report.

1.11.2 Cockpit Voice Recorder (CVR)

Manufacturer : L3 Communications
Model : FA 2100
Serial Number : 000646989
Part Number : 2100-1025-02

The CVR data was successfully downloaded by NTSC at its facility and contained 120 minutes of good quality recording.

1.12 Wreckage and impact information

1.12.1 Preliminary Brake examination

On 18 March 2012 the NTSC was assisted by a team of personnel from SilkAir, Safran Messier-Bugatti-Dowty⁵ and the AAIB⁶ Singapore. The team, together with NTSC investigators, conducted an examination of the brake number 2 which was suspected to be the source of the smoke or fire. From examination the team revealed as follows:

- There was no damage or sign of fire on the wheel and brake assembly number 2;
- Found dry/burnt grease of estimate size 8 cm³ on heat shield;
- The tire pressure was normal, no fuse plugs melted;
- There was no sign of any hydraulic leak or grease on brake number 2;
- There was no sign of damage on the axle sleeve number 2.

5 Safran, Messier-Bugatti-Dowty is the company manufacture of the aircraft landing gear which installed on the 9V-SBH aircraft.

6 AAIB (Air Accident Investigation Bureau) is the investigation authority from Singapore which joined the investigation with NTSC as accredited representatives.

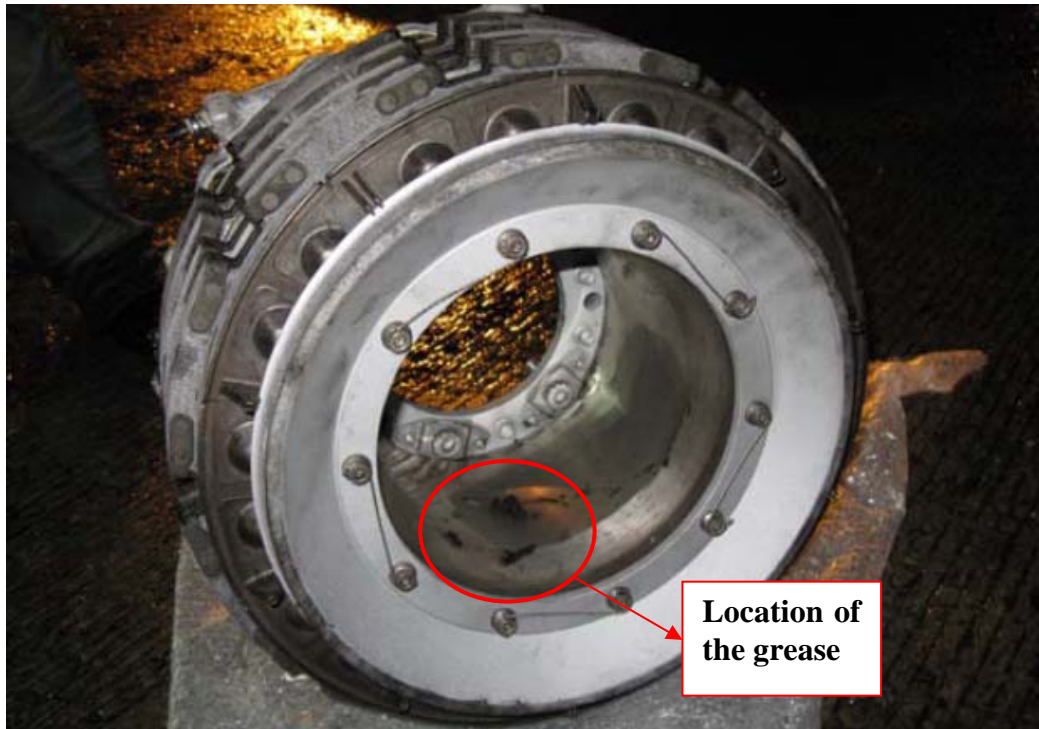


Figure 3: Residual grease on the brake number 2

1.12.2 Brake Examination

The brake unit number 2 (inner left main landing gear) was replaced prior the aircraft departed to Solo. During the installation of the wheel after brake replacement there was possibility of excess grease. On gear-up position, the grease could migrate to the heat sink. The grease is pushed by inner bearing up to torque tube bushing.

During the brake application on landing the temperature of the heat sink increased and heated the excessive grease and created smoke.



Figure 4: Hole that may allow excess grease to migrate to hot brake area

1.13 Medical and Pathological information

Not relevant to this occurrence

1.14 Fire

There was no evidence of fire in-flight or after the aircraft landed.

1.15 Survival Aspects

After received fire confirmation from the Marmo tower the SLK pilot declared emergency and evacuated the passenger by the escape slides.

The fire fighters immediately proceeded to the aircraft after received the emergency information from the Marmo tower.

The fire fighters and the ground handling staff from Silk Air stated that they did not see a fire from the aircraft.

1.16 Tests and Research

Not relevant to this occurrence.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

Aircraft owner	:	SilkAir (Singapore) PTE LTD
Aircraft operator	:	SilkAir (Singapore) PTE LTD
		25 Airline Road
		Airline House
		Singapore 819829
Air operator certificate	:	AOC Number 3/2012

1.17.2 Adi Sumarmo Airport

Adi Sumarmo Airport is a military airport and use also for civil aviation operation. The Civil aviation operation is being managed by PT Angkasa Pura I.

PT. Angkasa Pura I is the State-Owned Enterprises engaging in airport and air traffic services in Eastern Indonesia. PT. Angkasa Pura I managed 13 airports including the Adi Soemarmo International Airport, Solo.

The Adi Soemarmo tower controllers consist of military and civil controllers. All controllers held air Traffic controller license issued by DGCA.

The incident occurred during the morning shift, and there were three air traffic controllers on duty as the controller, assistant and the coordination officer.

The controller had a valid Level 4 ICAO Language Proficiency (ILP) issued by Indonesian Civil Aviation Institute (ICAI) on 5 September 2009. The investigation team could not find any evidence of the ICAO Language Proficiency (ILP) for the assistant.

Referred from the Civil Aviation Safety Regulation (CASR) part 69 chapters 69.012 Language Proficiency, the ILP Level 4 should be evaluated at least once every three years.

1.18 Additional Information

1.18.1 Wheel/brake area fires

The possibility of grease causing wheel/brake area fires is well documented. Refer to In Service Experience (ISE) chart Bibliography:

- Boeing publication: extract from “Aero quarterly Issue 26_Quarter 02 | 2007.”
“Wheel/brake-area fires are typically caused by a buildup of grease on the axle during service or the application of excessive amounts of grease during wheel/tire changes and brake installations, and the presence of a heat source, namely the brakes. During brake lubrication, excessive grease can also collect in the cavity between the piston housing and torque tube pedestal bushing due to a damaged or missing grease seal or excessive lubrication through the brake piston housing axle bushing lubrication fitting.”
- Flight Safety Foundation – Aviation Mechanics Bulletin
“Greasing errors cited in B-747 Landing gear fires” May-June 2005 – Vol.53 – N 3.

1.18.2 Witness Information

The maintenance engineer of the Silk Air which was standing on the apron stated that he saw the aircraft taxied and stopped without any fire or smoke, he also saw the aircraft performed the emergency disembarkation.

After the fire fighters arrived at the stopped aircraft, the maintenance engineer gave a sign not to perform any fire fighting action there was no indication of fire.

The maintenance engineer reported that the aircraft brake temperature were in a normal temperature.

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the NTSC approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

This analysis will discuss the factors associated with the pilot's decision to evacuate the passengers. The analysis will also discuss the source of smoke, communication, and the controller's qualification.

2.1 Source of smoke

The aircraft was in airworthy condition prior departure, brake assembly number 2 was replaced during overnight inspection.

During the installation of the wheel after brake replacement there was possibility of excess grease applied. On gear-up position, the grease could have migrate to the heat sink. The residue of grease with estimated size of 8 cm³ found on the heat sink was a positive indication of excessive grease applied. The grease heated during the brake application on landing and produced smoke.

This was supported with additional evidence of: the tire pressure was normal, no wheel fuse plugs melted and the witness did not see fire or smoke. There was no indication of the damage that could produce spark or sign of fire.

2.2 Communication

The communication between tower controller and the pilot in standard phraseology was normal before the aircraft landed. After the aircraft landed the tower controller tried to inform the pilot in an unclear communication that "smoke and fire" was observed on the left main landing gear.

It was obvious that the controller could not explain in good English. The communication was assisted by LNI pilot by translating to and from Indonesia and English.

The controller's communication problem was known by the assistant who took over control of the communication with SLK pilot. The assistant also could not describe the real situation. When the SLK pilot requested for reconfirmation of the level of smoke. The assistant firmly stated that there was moderate fire. Based on this information, the PIC decided to evacuate the passengers. There was no evidence of fire.

The controller and the assistant did not have sufficient English language proficiency to provide the SLK pilot with a clear distinction between the presence of 'smoke' and/or 'fire'.

The English language proficiency of the controllers was adequate for routine communications using standard phraseology. However, when an unexpected event occurred they did not have the ICAO Level 4 English language skills needed to deal with the misunderstandings in their communication with the SLK pilot. Their attempts at communication were characteristic of ICAO Level 3 English, where vocabulary range is limited and word choice often inappropriate. This meant they were not able to adequately describe the situation to the SLK pilot, despite repeated questioning.

2.3 Controller qualifications

The controller medical certificate valid until 28 May 2011 and the of ILP certificate level 4 was valid until September 2012. With ILP certificate level 4, the controller was not able to communicate in good English to inform the SLK pilot of the existence of smoke on the landing gear.

The assistant did not attain appropriate standard level .

The assistant could not give an accurate account of the situation to the SLK pilot question relating to the intensity of smoke.

Based on these data both controllers were not eligible to conduct duty as controller.

3 CONCLUSIONS

3.1 Findings

- a. The aircraft was airworthy prior the accident and there was no evidence of system malfunction during the flight.
- b. The flight crew had the valid license.
- c. The controller had valid ILP level 4, medical certificate valid until May 2011, and the controller certificate valid until January 2011.
- d. The assistant had valid license until July 2012, medical certificate valid until May 2011, and uncertified ILP level 4.
- e. The brake assembly number 2 was replaced at the night stop before departed to Solo.
- f. The controller observed smoke on the left main landing gear.
- g. The controllers could not communicate in good English other than standard phraseology. The communication was assisted by another pilot by translating to and from Indonesia and English.
- h. There was no damage or sign of fire on the wheel and brake assembly number 2;
- i. Found grease residue of estimate size of 8 cm³ on heat sink;
- j. The tire pressure was normal, no fuse plugs melted;
- k. There was no sign of any hydraulic leak on brake number 2;
- l. There was no indication of the damage that may produce spark or sign of fire.
- m. The pilot declared emergency and evacuated the passenger by the escape slides. One of the passengers had a minor injury during the evacuation.
- n. There were other person conversation not related to the controller duty on the background of the ATC controller

3.2 Factors⁹

Uncertain identification combined with ineffective communication by the controller caused the pilot to make the emergency decision.

⁹ “Factors” is defined as events that might cause the occurrence. In the case that the event did not occur then the accident might not happen or result in a less severe occurrence.

4 SAFETY ACTION

At the time of issuing this draft final investigation report, the National Transportation Safety Committee had not been informed of any safety actions taken by involve parties resulting from this occurrence.

5 SAFETY RECOMMENDATIONS

Refer to the factual data identified in this investigation that controllers and assistant were not eligible to conduct duty as controller this condition might be exist in the other controller and airports.

As a result of this investigation, the National Transportation Safety Committee issued safety recommendations to address safety issues identified in this report.

5.1 PT Angkasa Pura I/ Air Navigation Indonesia

- To ensure personnel conducting their duty holds the valid certificate.
- To ensure controller able to communicate in English other than standard phraseology of radio telephony.
- To emphasis the policy of sterile control tower room.

5.2 Directorate General of Civil Aviation

- To review the standard of training and checking system by approved training provider in conducting ICAO Language Proficiency (ILP) training.
- To ensure personnel performs their duty hold the valid certificate.