

**FINAL**

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**NATIONAL  
TRANSPORTATION  
SAFETY  
COMMITTEE**

*Aircraft Accident Investigation Report*

**PT. Lion Mentari Airlines (Lion Air)**

**Boeing McDonnell Douglas MD-90 ; PK – LIL**

**Soekarno - Hatta International Airport, Jakarta**

**Republic of Indonesia**

**9 March 2009**



**NATIONAL TRANSPORTATION SAFETY COMMITTEE  
MINISTRY OF TRANSPORTATION  
REPUBLIC OF INDONESIA  
2012**

This Final Report was produced by the National Transportation Safety Committee (NTSC), Ministry of Transportation Building 3rd Floor, Jalan 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 Organisation, Aviation Act (UU No.1/2009), and Government Regulation (PP No. 3/2001).

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## GLOSSARY OF ABBREVIATIONS

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AOC	Air Operator Certificate
ATC	Air Traffic Control
ATPL	Air Transport Pilot License
ATS	Air Traffic Service
°C	Degrees Celsius
CRM	Cockpit Recourses Management
CSN	Cycles Since New
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
FL	Flight Level
F/O	First officer or Copilot
FDR	Flight Data Recorder
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IIC	Investigator in Charge
ILS	Instrument Landing System
Kg	Kilogram(s)
Km	Kilometer(s)
KNKT / NTSC	<i>Komite Nasional Keselamatan Transportasi /</i> National Transportation Safety Committee
Kts	Knots (NM/hour)
Mm	Millimeter(s)
MTOW	Maximum Take-off Weight
NDT	Non Destructive Test
NM	Nautical mile(s)
PAPI	Precision Approach Path Indicator
PIC	Pilot in Command
QFE	Height above aerodrome elevation (or runway threshold elevation) based on local station pressure
QNH	Altitude above mean sea level based on local station pressure
S/N	Serial Number
SSCVR	Solid State Cockpit Voice Recorder
SSFDR	Solid State Flight Data Recorder
TS/RA	Thunderstorm and rain

TAF	Terminal Aerodrome Forecast
TSN	Time Since New
TT/TD	Ambient Temperature/Dew Point
TTIS	Total Time in Service
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WITA	<i>Waktu Indonesia Tengah</i> / Indonesia Central Standard Time

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## **INTRODUCTION**

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### **SYNOPSIS**

On 9 March 2009, a Boeing McDonnell Douglas MD-90 aircraft, registered PK-LIL, operated by PT. Lion Mentari Airline (Lion Air) as flight number LNI-793, departed from Sultan Hasanuddin Airport (WAAA), Makassar, Ujung Pandang, Sulawesi at 0636 UTC for Soekarno-Hatta International Airport (WIII), Jakarta. The estimated flight hour from Makassar to Jakarta was 2 hours. The crew consisted of two pilots and four flight attendants. There were 166 adult passengers.

The copilot was the pilot flying for the sector, and the pilot in command (PIC) was the support/monitoring pilot.

During the approach to runway 25L at Jakarta, the weather at the airport was reported as wind direction 200 degrees, wind speed 20 knots, visibility 1,000 meters, and rain. The PIC reported that he decided to take over control from the copilot.

The PIC later reported that he had the runway in sight passing through 1,000 feet on descent, and he disengaged the autopilot at 400 feet. At about 50 feet the aircraft drifted to the right and the PIC initiated corrective action to regain the centreline. The aircraft touched down to the left of the runway 25L centerline and then commenced to drift to the right. The PIC reported that he immediately commenced corrective action by using thrust reverser, but the aircraft increasingly crabbed along the runway with the tail to the right of runway heading. The investigation subsequently found that the right thrust reverser was deployed, but left thrust reverser was not deployed.

The aircraft stopped at 0835 on the right side of the runway 25L, 1,095 meters from the departure end of the runway on a heading of 152 degrees; 90 degrees to the runway 25L track. The main landing gear wheels collapsed, and still attached to the aircraft, were on the shoulder of the runway and the nose wheel was on the runway.

The passengers and crew disembarked via the front right escape slide and right emergency exit windows. None of the occupants were injured



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# 1 FACTUAL DATA

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## 1.1 History of the flight

On 9 March 2009, a Boeing McDonnell Douglas MD-90 aircraft, registered PK-LIL, operated by Lion Air as flight number LNI-793, departed from Sultan Hasanuddin Airport (WAAA)<sup>1</sup>, Makassar, Ujung Pandang, Sulawesi at 14:36 local time (06:36 UTC)<sup>2</sup> for Soekarno – Hatta International Airport (WIII)<sup>3</sup>, Jakarta. The estimated flight hour from Makassar to Jakarta was 2 hours. The crew consisted of two pilots and four flight attendants. There were 166 adult passengers.

The copilot was the pilot flying for the sector, and the pilot in command (PIC) was the support/monitoring pilot.

During the approach to runway 25L at Jakarta, the weather at the airport was reported as wind direction 200 degrees, wind speed 20 knots, visibility 1,000 meters, and rain. The PIC reported that he decided to take over control from the copilot.

The PIC later reported that he had the runway in sight passing through 1,000 feet on descent, and he disengaged the autopilot at 400 feet. At about 50 feet the aircraft drifted to the right and the PIC initiated corrective action to regain the centreline.

The aircraft touched down to the left of the runway 25L centerline and then commenced to drift to the right. The PIC reported that he immediately commenced corrective actions and by using thrust reverser, but the aircraft increasingly crabbed along the runway with the tail to the right of runway heading.

The aircraft stopped at 0835 on the right side of the runway 25L, 1,095 meters from the departure end of the runway on a heading of 152 degrees; 90 degrees to the runway 25L track. The main landing gear wheels collapsed, and still attached to the aircraft, were on the shoulder of the runway and the nose wheel was on the runway.

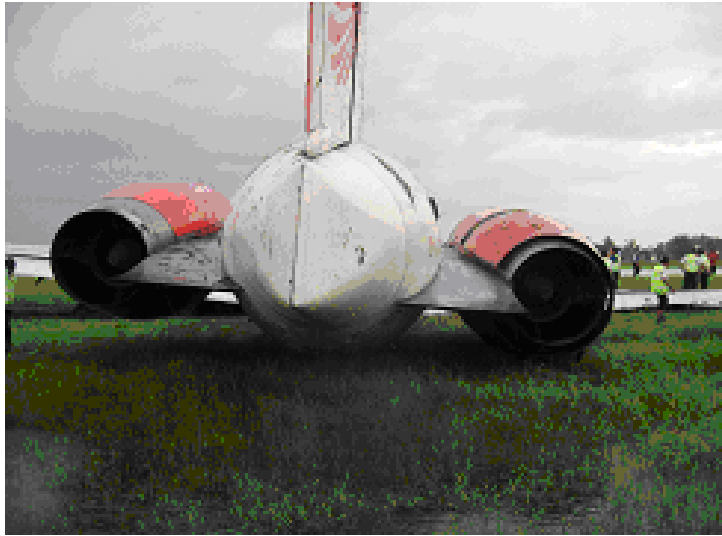
The passengers and crew disembarked via the front right escape slide and right emergency exit windows. None of the occupants were injured.

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<sup>1</sup> Sultan Hasanuddin Airport (WAAA), Makassar, Ujung Pandang, Sulawesi is referred to as 'Makassar' in this report.

<sup>2</sup> The 24-hour clock in Coordinated Universal Time (UTC) is used in this report to describe the local time as specific events occurred. Local time Makassar was Central Indonesia Standard Time (Waktu Indonesia Tengah (WITA)) is UTC +8 hours.

<sup>3</sup> Soekarno – Hatta International Airport (WIII), Jakarta is referred to as 'Jakarta' in this report.



**Figure 1: PK-LIL at Soekarno-Hatta Airport, Jakarta after accident**

## **1.2 Injuries to persons**

<b>Injuries</b>	<b>Flight crew</b>	<b>Passengers</b>	<b>Total in Aircraft</b>	<b>Others</b>
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
Nil Injuries	6	166	172	-
<b>TOTAL</b>	<b>6</b>	<b>166</b>	<b>172</b>	<b>-</b>

## **1.3 Damage to aircraft**

Both main landing gear assemblies collapsed and were significantly damaged. Tire number 3 (inboard right main wheel) exploded. The aircraft's right-wing landing light was found 45 meters from the runway 25L threshold mark, and the right wing tip was damaged.

The right wing, and the right flaps were damaged.



**Figure 2: Right fuselage showing emergency exits opened, the damage of right wing and flap**



**Figure 3: Left Main Landing Gear collapse sidewise**

#### **1.4 Other damage**

The surface of the runway had gouging 1 centimetre deep, for about 213 meters. The taxiway SC3 signboard was hit by the right main landing gear and was substantially damaged.

## **1.5 Personnel Information**

### **1.5.1 Pilot in Command**

Age : 61 years  
Gender : Male  
Nationality : Indonesian  
Type of licence : ATPL  
Valid to : 31 July 2009  
Rating : MD 82, MD 90  
Medical Certificate : Class 1  
Medical limitation : Nil  
Valid to : 27 July 2009  
Last line check : 7 January 2008  
Last proficiency check : 30 December 2008  
Total flying time : about 25,000 hours  
Total on this type : about 5,000 hours  
Total last 90 days : 74 hours 24 minutes  
Total on type last 90 days : 74 hours 24 minutes  
Total last 30 days : 26 hours 6 minutes  
Total on the type last 24 hours : 2 hours 6 minutes

### **1.5.2 Copilot**

Age : 34 years  
Gender : Male  
Nationality : Indonesian  
Type of licence : ATPL  
Valid to : 31 August 2009  
Rating : MD 82, MD 90  
Medical certificate : Class 1  
Medical limitation : Nil  
Valid to : 2 August 2009  
Last line check : 30 August 2008

Last proficiency check : 17 July 2008  
Total flying time : about 5,000 hours  
Total on this type : about 800 hours  
Total last 90 days : 199 hours 27 minutes  
Total on type last 90 days : 199 hours 27 minutes  
Total last 30 days : 79 hours  
Total on the type last 24 hours : 2 hours 6 minutes

## **1.6 Aircraft information**

### **1.6.1 Aircraft data**

Aircraft Registration : **PK-LIL**  
Aircraft Serial Number : 53573  
Aircraft Manufacturer : Boeing McDonnell Douglas, USA  
Aircraft Type/Model : MD-90-30  
Date of Manufacture : January 1998  
Certificate of Airworthiness Valid Until : 18 April 2009  
Certificate of Registration Valid Until : 14 April 2009  
Total Hours Since New (TSN) : 18,695 hours 57 minutes  
Total Cycles Since New (CSN) : 14,507 cycles

### **1.6.2 Weight and balance**

The aircraft was being operated within the approved weight and balance limitations.

## **1.7 Meteorological information**

The weather conditions reported on the aerodrome terminal information service were:

Wind direction : 200 degrees  
Wind speed : 20 knots  
Visibility : 1,000 meters, and rain.

## **1.8 Aids to navigation**

The runway 25L instrument landing system and Precision Approach Path Indicator (PAPI) were operating and serviceable at the time of the accident.

## **1.9 Communications**

The crew had no difficulty communicating with air traffic control during the flight.

## **1.10 Aerodrome information**

Airport Name	:	Soekarno – Hatta International Airport, Jakarta
Airport Identification	:	WIII
Elevation	:	21 feet
Airport Operator	:	PT. Angkasa Pura II (Persero)
Airport Category	:	I
Runway Direction	:	07 – 25
Runway Length	:	3,600 meters
Runway Width	:	60 meters
Surface	:	Rigid

## **1.11 Flight recorders**

The aircraft fitted with Digital Flight Data Recorder (DFDR) and Cockpit Voice Recorder). The DFDR and CVR were recovered and readout under supervise NTSC investigators.

### **1.11.1 Digital flight data recorder**

Manufacture	:	Allied Signal
Part number	:	980-4700-0031
Serial Number	:	3991

### 1.11.2 Flight data recorder readout

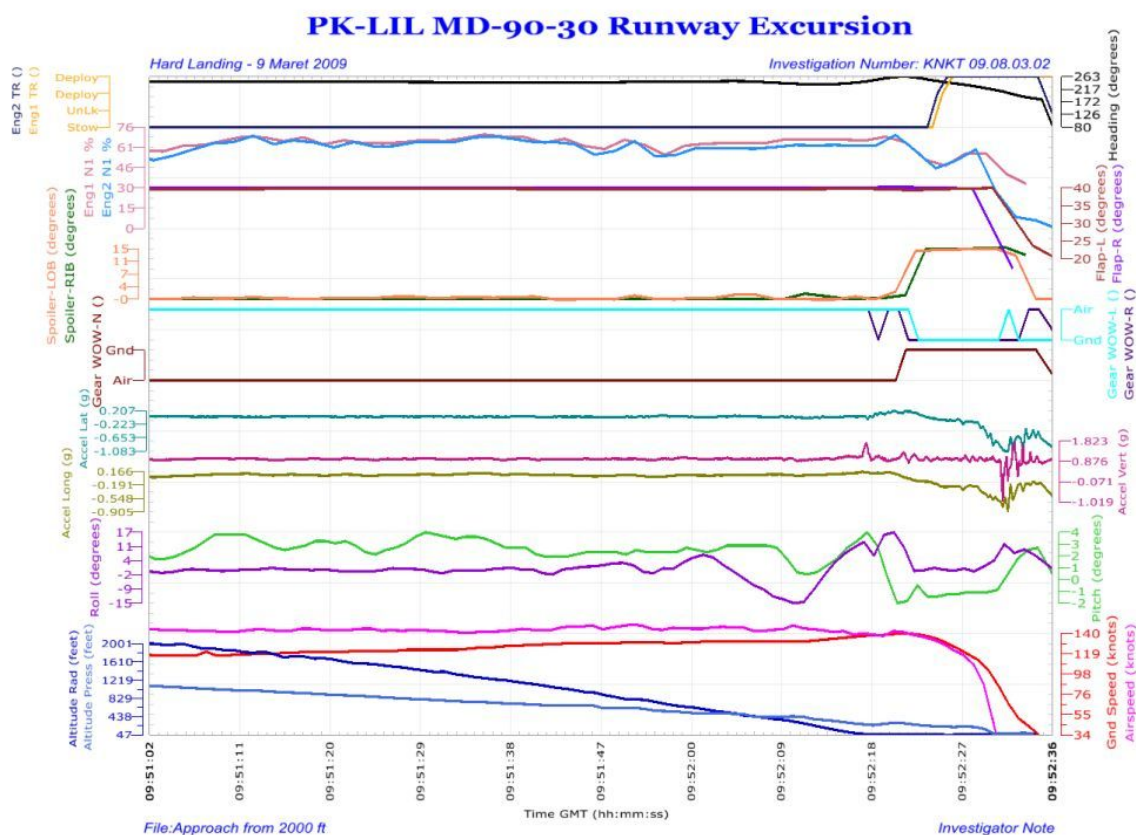


Figure 4: FDR readout

### 1.11.3 Cockpit voice recorder

Manufacture : Loral  
 Part number : S100-0080-00  
 Serial Number : 01085

### 1.11.4 Notable of CVR

The CVR readout was a good quality sound and duration 30 minutes 37 seconds.

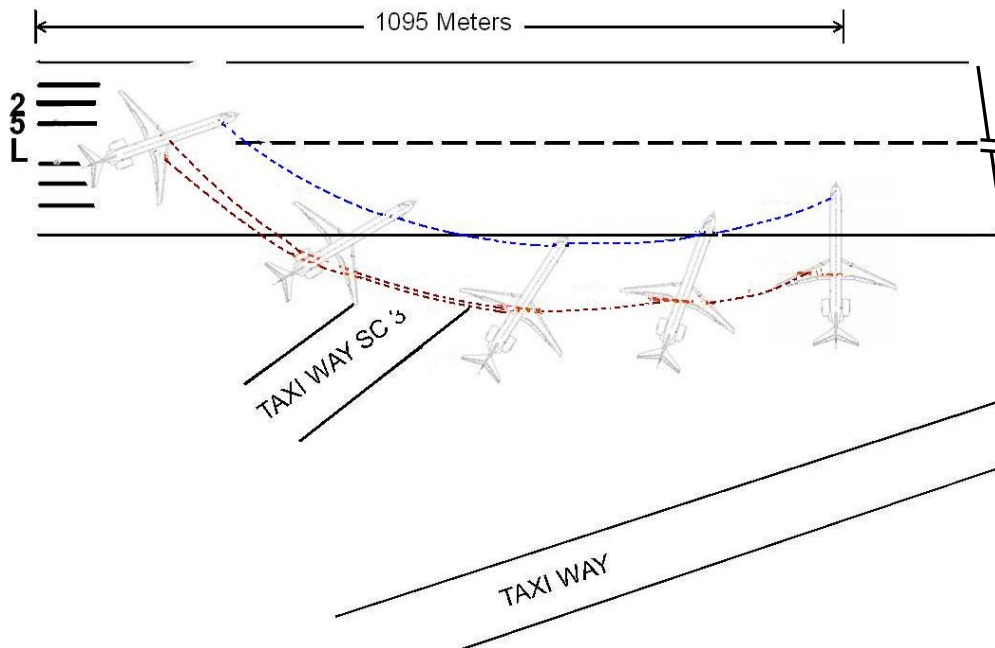
The CVR has four channels and all channels were between pilot and ATC.

## 1.12 Wreckage and impact information

The aircraft remained intact. The main landing gear assemblies collapsed and were substantially damaged. Tire number 3 (inboard right main wheel) exploded.



**Figure 5: Nose tyre mark outside of the runway**



**Figure 6: Sketch the accident sequence**

### **1.13 Medical and pathological information**

Not relevant to this accident.

### **1.14 Fire**

There was no pre-or post-accident fire.



## **1.15 Survival aspects**

Not relevant to this accident.

## **1.16 Tests and research**

Not relevant to this accident.

## **1.17 Organizational and management information**

### **1.17.1 PT. Lion Mentari Airlines (Lion Air)**

Aircraft Owner : Wells Fargo Bank Northwest, National Association

Aircraft Operator : PT. Lion Mentari Airlines

Address : Lion Air Tower

Jl. Gajah Mada No.7 Jakarta 10130

Air Operator Certificate number: AOC 121-010

### **1.17.2 Maintenance**

PT. Lion Mentari Airlines has a maintenance facility named Lion Technic. The approved workscope of the Lion Technic was limited to engine, airframe, accessories, NDT. The aircraft had been maintained in accordance with approved maintenance program.

## **1.18 Additional Information**

There was no other factual information that was relevant to the circumstances leading up to the occurrence.

## **1.19 Useful or effective investigation techniques**

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

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## 2 ANALYSIS

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During the approach to runway 25L at Jakarta, the PIC reported that he decided to take over control from the copilot while passing 100 feet.

At passing 1,000 feet the PIC reported had runway in sight and disengaged autopilot at 400 feet. At about 50 feet the PIC initiated corrective action to regain the centreline while the aircraft continuous drifted to the right.

The aircraft touched down to the left of the runway 25L centreline and then commenced to drift to the right. The PIC immediately commenced corrective action by using thrust reverser, but the aircraft increasingly crabbed along the runway with the tail to the right of runway heading.

The investigation subsequently found that the right thrust reverser was deployed, but left thrust reverser was not deployed, showed PIC corrective action.

The investigation found scraped for approximately 10 meters long on the ground surface, at a distance of 20 meters before the runway end on the right side, and wheel marks at touch-down zone.

The investigation also found the right wing tip was damaged, and landing light was broken, and found behind the touch-down zone. This indicated that the right wing tip touched the ground before the touch-down zone, and wheel marks on the touch-down zone, showed the aircraft conducting an un-stabilized approach before touched the ground.

The nose wheel mark on the shoulder of the runway was an evidence of the aircraft was drifted out of the runway, and back again into the runway, to the final position of the aircraft 90 degrees to the runway.

The PIC corrective actions to regain the aircraft to the centerline were not successful.

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## **3 CONCLUSIONS**

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### **3.1 Findings**

1. Both pilots were licensed and qualified for the flight in accordance with existing Indonesian regulations.
2. The aircraft was certified as being airworthy when dispatched for the flight.
3. The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.
4. The mass and the centre of gravity of the aircraft were within the prescribed limits.
5. No useful information was obtained from the cockpit voice recorder.
6. There was no evidence of any pre-landing defect or malfunction in the aircraft that could have contributed to the accident.
7. The PIC reported that he decided to take over control from the copilot while passing 100 feet.
8. The investigation found scraped 10 meters long on the ground surface, at a distance of 20 meters before the runway end on the right side, and wheel marks at touch-down zone.
9. The investigation also found right landing light broken off and laid down at the runway surface before touch-down zone.
10. Scraped on the ground surface, the damage of right wing tip, and right landing light broken off, indicated that the wing tip hit the ground before the main wheel touched the runway, then the aircraft continued ground drifted to the right, nose and main wheels were on shoulder, to the final position.
11. The PIC initiated corrective actions and deployed the right thrust reverser to regain the centreline while the aircraft continuous ground drifted to the right. The corrective actions were not successful.

### **3.2 Causes**

The aircraft was not stabilized approach at 100 feet above the runway.

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## **4 SAFETY ACTIONS**

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At the time of issuing this Draft Accident Investigation Report, the National Transportation Safety Committee had not been informed of any safety actions resulting from this accident.

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## **5 SAFETY RECOMMENDATIONS**

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As a result of this investigation to date, the National Transportation Safety Committee issues the safety recommendations, as follows:

### **5.1 Recommendation to PT. Lion Mentari Airlines**

The National Transportation Safety Committee recommends that the PT. Lion Mentari Airlines should review the training program including Simulator sessions.

### **5.2 Recommendation to PT. Lion Mentari Airlines**

The National Transportation Safety Committee recommends that the PT. Lion Mentari Airlines should review the Cockpit Resource Management (CRM) training requirement.

### **5.3 Recommendation to Directorate General of Civil Aviation**

The National Transportation Safety Committee recommends that the PT. Lion Mentari Airlines should renew the pilot license in accordance with the training requirement.