

PRELIMINARY
KNKT.16.05.13.04

**KOMITE
NASIONAL
KESELAMATAN
TRANSPORTASI**

Aircraft Accident Investigation Report

**Etihad Airways
Airbus A330 -243; A6-EYN
Near Bangka Islands
Republic of Indonesia
4 May 2016**



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

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

The preliminary report consists of factual information collected until the preliminary report published. This report will not include analysis and conclusion.

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However, the KNKT fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

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ABBREVIATIONS AND DEFINITIONS

ACARS	:	Aircraft Communications Addressing and Reporting System
ACC	:	Area Control Centre
AP	:	Autopilot
ATPL	:	Airline Transport Pilot License
CM	:	Cabin Manager
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
FDR	:	Flight Data Recorder
FL	:	Flight Level
ft	:	Feet
G	:	Gravitational Force
Km	:	Kilometre
KNKT	:	Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
OM	:	Operations Manual
P3	:	The third pilot
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
SEPM	:	Safety & Emergency Procedure Manual
SIC	:	Second in Command
UTC	:	Universal Time Coordinated
VDL	:	Code for medical limitation, which means the holder shall wear corrective lens for defective distant vision and carry spare set of spectacles
VHF	:	Very High Frequency

INTRODUCTION

SYNOPSIS

This preliminary report is based on initial factual data gathered from recorders, observation in the aircraft cabin interior, operator's operation manuals and interview with the entire crew and the injured passengers a day after the occurrence.

On 4 May 2016, an Airbus A330-243 aircraft registered A6-EYN was being operated by Etihad Airways as a passenger scheduled flight from Abu Dhabi International Airport (OMAA), Abu Dhabi, United Arab Emirates. The flight departed at 0130 UTC and scheduled to arrive at Soekarno-Hatta International Airport (WIII) Jakarta, Indonesia at 0746 UTC.

On-board the flight was 274 occupants and consisted of three pilots, nine flight attendants and 262 passengers. The entire flight since departed and cruised at Flight Level (FL) 390 was uneventful until commencing to descend in a clear sky with no echoes on the weather radar

At 0640 UTC, the aircraft encountered severe turbulence. The SIC turned the fasten seatbelt sign and anti-ice ON. The autopilot disengaged, the PIC unable to reengage the autopilot and flew the aircraft manually. At about 30 seconds later, after encountered the severe turbulence, the aircraft was in stable flight and the PIC was able to reengage the autopilot. The continued to Soekarno-Hatta International Airport and landed on runway 07L at 0724 UTC.

There were two flight attendants and nine passengers seriously injured and 22 passengers minor injured.

The aircraft had several interior parts damaged such as detached ceiling, broken passenger service units and oxygen mask container dropped.

Observation on the operator's operation manuals concerning to the fasten seatbelt and standard information phraseology procedures whenever required for the safety reasons are described in the Operations Manual Part-A: Safety & Emergency Procedure Manual (SEPM) chapter 5, and the Operations Manual Part-A chapter 12.

As of the initial factual information and findings gathered, the Komite Nasional Keselamatan Transportasi is considering that there are two safety issues to be examined. These are related to the weather phenomenon concerning to Clear Air Turbulence and the fasten seatbelt procedures.

For the purpose of initial the prevention, KNKT issued safety recommendations to address the safety issues identified in this preliminary report to the Etihad Airways.

The investigation is continuing and will include relevant information.

KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 4 May 2016, an Airbus A330-243 aircraft registered A6-EYN was being operated by Etihad Airways as a passenger scheduled flight from Abu Dhabi International Airport (OMAA), Abu Dhabi, United Arab Emirates ¹ to Soekarno-Hatta International Airport (WIII) Jakarta, Indonesia².

At 0130 UTC, the aircraft departed from Abu Dhabi and according to the flight plan the estimated time of arrival Jakarta would be at 0746 UTC. Onboard the flight was 274 occupants and consists of three pilots, nine flight attendants and 262 passengers. Pilot in Command (PIC) was Pilot Flying (PF), Second in Command (SIC) was Pilot Monitoring (PM) and third pilot (P3) seated on the jump seat was additional pilot for the enlarge crew assignment.

The entire of the flight since departed and cruised at Flight Level (FL) 390 was uneventful until commencing to descend with no significant cloud shown on the aircraft weather radar.



Figure 1: The A6-EYN a day after the occurrence

At about 15 minutes before top of descent and the flight was under Jakarta Area Control Center unit (ACC), the PIC called cabin manager to come to the cockpit in order to brief about the arrival preparation. After being briefed, the cabin manager returned to cabin, suddenly at 0640 UTC the aircraft encountered severe turbulence and the autopilot disconnected. The SIC turned on the fasten seatbelt sign and anti-ice. The PIC unable to reengage the autopilot then flew the aircraft manually. At about 30 seconds later the aircraft was in stable flight and the PIC was able to reengage the autopilot.

In about a minute later, the ACC controller asked the pilot whether the aircraft was starting to descend and was replied by the pilot that the aircraft experienced turbulence.

¹ Abu Dhabi International Airport (OMAA), Abu Dhabi, United Arab Emirates will be named as Abu Dhabi for the purpose of this report.

² Soekarno-Hatta International Airport (WIII), Jakarta, Indonesia will be named as Jakarta for the purpose of this report.

When the aircraft was stable, the cabin manager conducted cabin check and announced to the passengers about the recent unexpected turbulence. The cabin manager went to middle right passenger door (R3 door) and called the pilot through interphone to inform the damaged of the cabin interior and the injured occupants. Then the PIC asked the P3 to check the cabin situation. Based on visual observation, the P3 reported to the PIC related to the cabin interior damaged and injured occupants.

The pilot informed the condition to ground handling provider of Etihad Airways in Jakarta via radio communication and requested assistance on arrival and also informed to flight operation of Etihad Airways in Abu Dhabi via Aircraft Communications Addressing and Reporting System (ACARS).

At about 0724 UTC, the aircraft landed safely on Jakarta.

All injuries occupants evacuated to the nearest hospital.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	2	9	11	-
Minor	-	22	22	-
TOTAL	2	31	33	-

1.3 Damage to Aircraft

The aircraft had several interior parts damaged such as detached ceiling, broken passenger service units and oxygen mask container dropped.

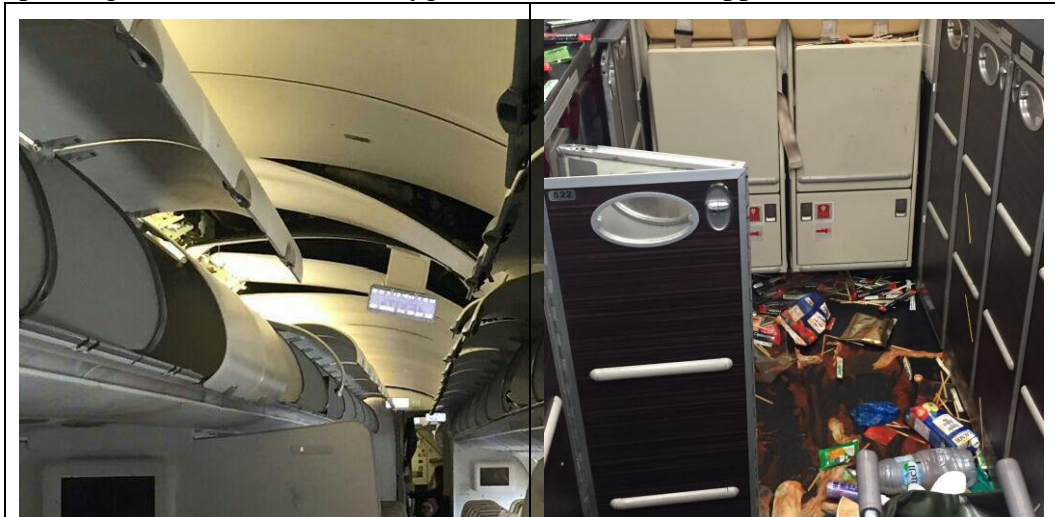


Figure 2: Cabin ceiling and mid galley condition post the severe turbulence

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 : 48
Nationality : Portugal
Marital status : Married
Date of joining company : 10 December 2013
License : ATPL
 Date of issue : 21 April 2014
 Aircraft type rating : A320, A330
Instrument rating validity : 30 November 2016
Medical certificate : First Class
 Last of medical : 14 July 2015
 Validity : 4 August 2016
 Medical limitation : The holder shall wear corrective lens for defective distant vision and carry spare set of spectacles (VDL)
Last line check : 26 February 2016
Last proficiency check : 7 November 2015

Flying experience

Total hours : 11,280 hours 12 minutes
Total on type : 2,337 hours 8 minutes
Last 90 days : 236 hours 47 minutes
Last 60 days : 77 hours 33 minutes
Last 24 hours : 8 hours 11 minutes
This flight : 8 hours 11 minutes

1.5.2 Second in Command

Gender : Male
Age : 26
Nationality : United Arab Emirates
Marital status : Single
Date of joining company : 14 March 2011
License : CPL
 Date of issue : 16 January 2011

Aircraft type rating	: A320, A330
Instrument rating validity	: 31 March 2017
Medical certificate	: First Class
Last of medical	: 24 March 2016
Validity	: 31 March 2017
Medical limitation	: Nil
Last line check	: 18 October 2015
Last proficiency check	: 22 March 2016

Flying experience

Total hours	: 2,656 hours 38 minutes
Total on type	: 1,176 hours 12 minutes
Last 90 days	: 224 hours 51 minutes
Last 60 days	: 144 hours 15 minutes
Last 24 hours	: 8 hours 11 minutes
This flight	: 8 hours 11 minutes

1.5.3 Third Pilot

Gender	: Male
Age	: 31
Nationality	: Oman
Marital status	: Single
Date of joining company	: 8 October 2012
License	: ATPL
Date of issue	: 11 February 2016
Aircraft type rating	: A320, A330
Instrument rating validity	: 30 November 2016
Medical certificate	: First Class
Last of medical	: 28 February 2016
Validity	: 5 March 2017
Medical limitation	: Nil
Last line check	: 19 June 2015
Last proficiency check	: 7 November 2015

Flying experience

Total hours	: 2,280 hours 12 minutes
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Total on type	: 568 hours 38 minutes
Last 90 days	: 246 hours 13 minutes
Last 60 days	: 162 hours 56 minutes
Last 24 hours	: 8 hours 11 minutes
This flight	: 8 hours 11 minutes

1.5.4 Flight Attendants

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

1.6 Aircraft Information

1.6.1 General

Registration Mark	: A6-EYN
Manufacturer	: Airbus Industries
Country of Manufacturer	: France
Type/Model	: Airbus 330-243
Serial Number	: 832
Date of Manufacture	: 18 June 2007
Certificate of Airworthiness	
Issued	: 18 June 2007
Validity	: 16 June 2016 (refers to Airworthiness Review Certificate)
Category	: Transport (Passenger)
Limitations	: None
Certificate of Registration	
Number	: 35/07
Issued	: 18 June 2007
Time Since New	: 42,982 hours 50 minutes
Cycles Since New	: 7,727 cycles
Last Major Check	: 7 February 2016 (C check) 2 April 2016 (A check)
Last Minor Check	: 3 May 2016 (daily check)

1.6.2 Engines

Manufacturer	: Rolls Royce
Type/Model	: RB211 TRENT 772 B60-16
Serial Number-1 engine	: 41410

- Time Since New : 43,444 hours 59 minutes
 - Cycles Since New : 7,905 cycles
- Serial Number-2 engine : 41430
- Time Since New : 41,490 hours 49 minutes
 - Cycles Since New : 7,550 cycles

1.7 Meteorological Information

The pilot stated that aircraft weather radar detected partial cumulus clouds formation on both sides of the flight track for about 10 to 15 nm.

The figure below shows satellite weather image at about 20 minutes prior to the severe turbulence occurrence and the illustration of flight track. The area of turbulence occurrence indicated by red circle and it was no significant cloud formation.

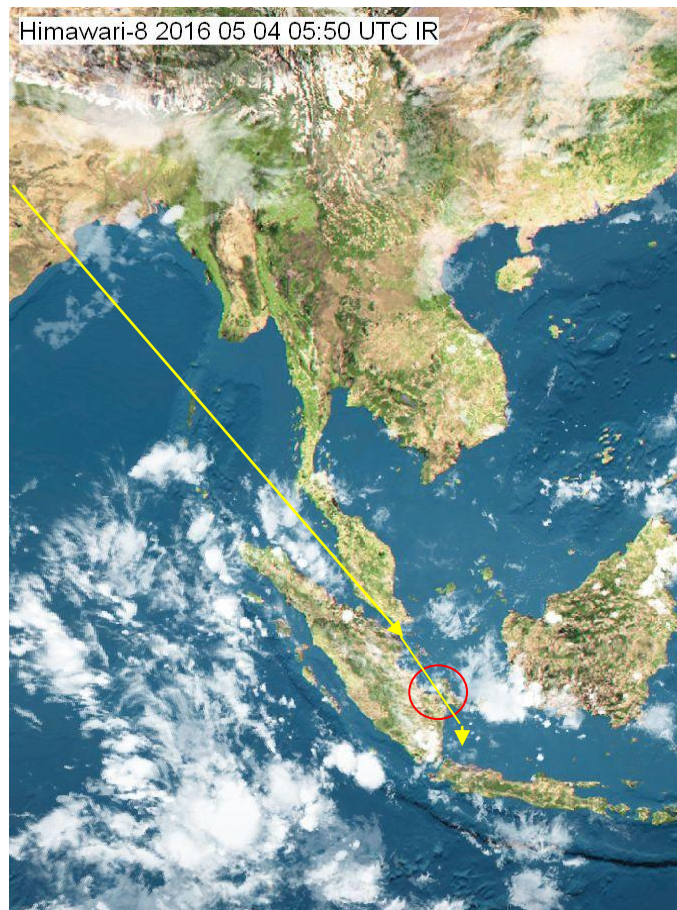


Figure 3: The weather of 20 minutes prior to the accident (red circle)

1.8 Aids to Navigation

Ground-based navigation aids / on-board navigation aids / aerodrome visual ground aids and their serviceability were not a factor in this occurrence.

1.9 Communications

The aircraft was equipped with three very high frequency (VHF) radio communication systems. The crew used two of the VHF radios for routine communications with air traffic control, and the remaining set was used for the aircraft communications addressing and reporting system (ACARS) data link system. All VHF radios were serviceable.

All communications between Jakarta ACC controllers and the pilots were recorded by ground based automatic voice recording equipment and cockpit voice recorder. The quality of the aircraft's recorded transmissions was good.

1.10 Aerodrome Information

The Soekarno-Hatta International Airport has 24 hours of Airport Clinic, and there are general hospital located in Tangerang (5 Km) and Jakarta (20 Km).

1.11 Flight Recorders

1.11.1 Flight Data Recorder

The aircraft was equipped with L-3 Communications Flight Data Recorder (FDR) with part number 2100-1020-02 and serial number 000113730. The FDR was successfully downloaded in KNKT recorder facility and recorded the significant of flight parameters which were related to this accident flight.

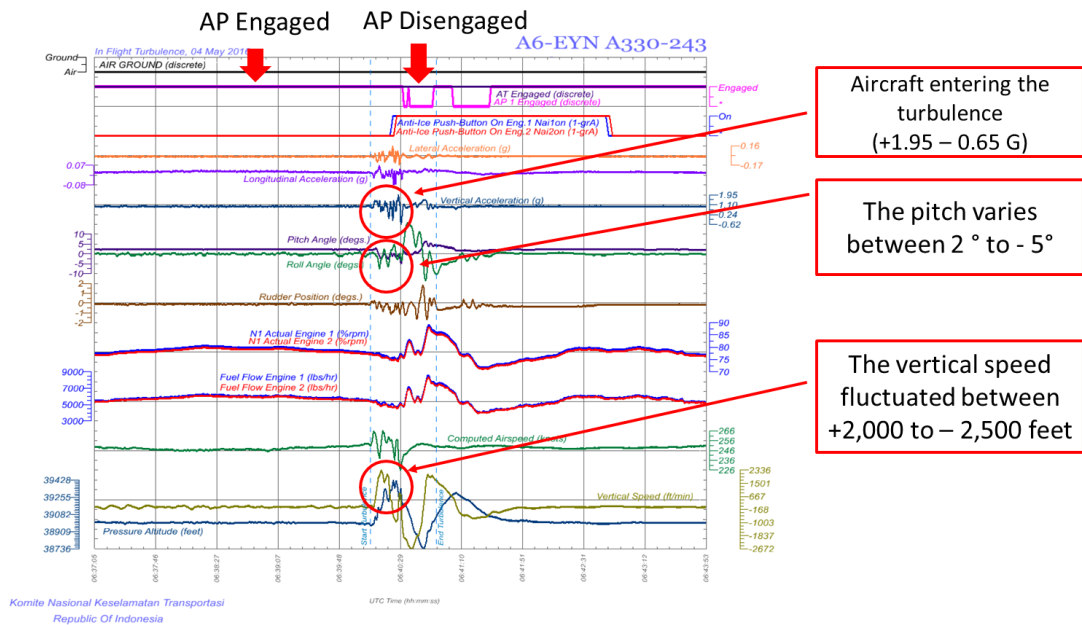


Figure 4: The relevant parameters downloaded from FDR

The sequence of events at approximate 0638 to 0655 UTC

- 06:38:45 UTC, approximate 2 minutes prior to the occurrence the aircraft was almost steady at altitude 39,000 feet.
- Between 06:40:10 to 06:40:33 UTC.
 - The aircraft altitude varied with the highest of 39,450 feet and the lowest

of 38,750 feet and followed by the vertical speed fluctuated approximate between +2,000 to -2,500 feet/minute.

- The Autopilot (AP) reacted to correct the altitude and this indicated by the aircraft pitch changes ranging from +2° to -5°.
- The Vertical Acceleration recorded between +1.95 to -0.65 G.
- AP disengaged 06:40:32 UTC
 - The AP disengaged.
 - The AP reengaged at 06:40:35 UTC for one second then disconnected again one second later.
- AP reengaged
 - 06:50:54 UTC, the aircraft stabilized at 39,000 feet and the AP reengaged.

1.11.2 Cockpit Voice Recorder

The aircraft was equipped with L-3 Communications Cockpit Voice Recorder (CVR) with part number 2100-4045-00 and serial number 000643370. The CVR was successfully downloaded in KNKT recorder facility and recorded 2 hours 4 minutes of good quality recording data. The significant excerpts recorded of two minutes before and one minute after severe turbulence describes as follows:

TIME (UTC)	FROM	TO	DESCRIPTION
6:21:53	ACC Controller	Pilot	Provided a clearance to fly direct to BOSLO ³ way point and to follow standard arrival.
6:38:58			Sound similar cockpit door open then a communication between Cabin Manager (CM) and PIC concerning to arrival preparation
6:40:11			Noisy sound similar to air turbulence
6:40:17			Chime (a sound of similar to aircraft system warning)
6:40:23			Noisy sound similar to air turbulence
6:40:32			A sound similar with autopilot disengage
6:40:34			A sound similar with autopilot disengage
6:40:43			The sound of prolong horn
6:40:52	ACC controller	Pilot	Asked whether the aircraft was descending.
6:40:54	Pilot	ACC	Confirmed that the aircraft just entered

³ BOSLO is a waypoint which located approximately 150 Nm from Soekarno-Hatta International Airport on heading 354° (03°37.5'S 106°23.5'E).

		controller	turbulence.
6:40:59	ACC controller	Pilot	Acknowledged and instructed to maintain FL390 and contact another ACC on the different frequency.
6:41:14	Pilot	ACC controller	Acknowledged and informed ACC controller that the aircraft was maintaining FL390.

1.12 Wreckage and Impact Information

The aircraft had several interior parts damaged such as detached ceiling, broken passenger service units and oxygen mask container dropped. The damaged occurred on the seat 10H and the other damage cabin ceilings were spread out in the aft cabin between seat rows 21 to 45.

The detail of damage cabin ceilings information will be included in the final report.

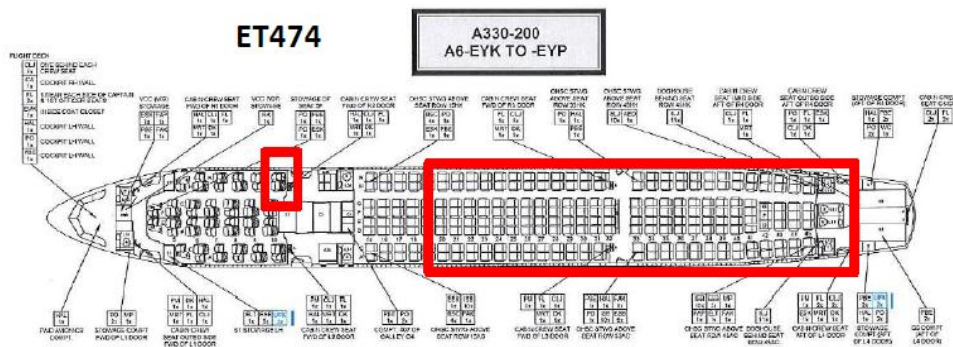


Figure 5: The area of the injured passenger seats and the damaged ceiling

1.13 Medical and Pathological Information

Referred to interview with the injured occupants, revealed that when encountering the turbulence, the FAs were servicing the passengers and some passengers were not using seatbelt and some others were in the toilet.

11 of the injured occupants stayed in hospital for further treatment and the 22 others were allowed to return home.

The detail of medical and pathological information will be included in the final report.

1.14 Fire

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

1.15 Survival Aspects

The injured passengers and crew were brought to the hospital outside the airport. The detail of the survival aspects will be included in the final report.

1.16 Tests and Research

This section will be described in the final report as necessary.

1.17 Organizational and Management Information

Aircraft Owner	: Union Five Leasing Limited
Address	: Walker House, 87 Mary Street, George Town, Grand Cayman KYI-9002, Cayman Islands
Aircraft Operator	: Etihad Airways
Address	: New Airport Road, PO Box 35566, Abu Dhabi, United Arab Emirates
Aircraft Operator Certificate	: AC-0003
Validity	: 31 October 2017

1.17.1 Operator's Manual

The Operations Manual Part-A subchapter 5.4.2 describes procedure for flight attendant announcement. The announcement one minute after landing gears retraction contains recommendation for passenger to keep the seatbelt fastened when seated, sleep and when the seatbelt sign is on.

According to the Operations Manual Part-A subchapter 12.12.1, a call "PAN PAN" shall be repeated three times to the air traffic controller if there is a condition concerning the safety of the aircraft or some person on board or within sight, which does not require immediate assistance.

On subchapter 12.12.2, a call "MAYDAY" shall be repeated three times to the air traffic controller if there is a condition of being threatened by serious and/or imminent danger and requiring immediate assistance.

In case of abnormal conditions "priority for landing" may be requested from air traffic controller to avoid any holding due to traffic.

The detail of the relevant organizational and management Information will be included in the final report.

1.18 Additional Information

The investigation is continuing and will include details but not limited to the following information:

- Weather phenomenon concerning to Clear Air Turbulence;
- Fasten seat belt procedures.

KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.19 Useful or Effective Investigation Techniques

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

2 FINDINGS⁴

According to factual information during the initial investigation, the KNKT found initial findings as follows:

1. The aircraft was airworthy prior to the occurrence and was operated within the weight and balance envelope.
2. The crew held valid licenses and medical certificates.
3. In this flight, the Pilot in Command (PIC) acted as Pilot Flying (PF) and Second in Command (SIC) acted as Pilot Monitoring (PM). The third pilot was in the flight deck as this flight required enlarges crew.
4. The entire of the flight since departed and cruised at Flight Level (FL) 390 was uneventful until commencing to descend with no significant cloud shown on the aircraft weather radar.
5. The pilot stated that aircraft weather radar detected partial cumulus clouds formation on both sides of the flight track for about 10 to 15 nm.
6. The satellite weather image at about 20 minutes prior to the severe turbulence occurrence indicated no significant cloud formation.
7. Prior to the occurrence the aircraft was almost stable at cruising altitude of FL390 (39,000 feet).
8. Between 06:40:10 UTC to 06:40:33 UTC, the aircraft encountered severe turbulence and altitude varied with the highest of 39,450 feet and the lowest of 38,750 feet, fluctuating of vertical speed approximate between +2,000 to -2,500, and the vertical acceleration between +1.95 to -0.65 G.
9. The Autopilot (AP) reacted to correct the altitude and this indicated by the aircraft pitch changes ranging from +2° to -5°.
10. The AP disengaged at 06:40:32 UTC.
11. At 06:40:11 UTC, a noisy sound similar to air turbulence recorded following by the SIC turned on the fasten seatbelt sign and anti-ice.
12. At 06:50:54 UTC, the aircraft stabilized at 39,000 feet and the AP reengaged.
13. The interview with the injured occupants revealed that when encountering the turbulence, the FAs were servicing the passengers and the several passengers were not using the safety belt and some others were in the toilet.
14. The Operations Manual Part-A subchapter 5.4.2 describes procedure for flight attendant announcement. The announcement one minute after landing gears retraction contains recommendation for passenger to keep the seatbelt fastened when seated, sleep and when the seatbelt sign is on.
15. The Operations Manual Part-A subchapter 12.12 describes procedures for abnormal situation declaration while immediate assistance required a call

⁴ 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.

“MAYDAY” and while immediate assistance not required a call “PAN PAN” shall be repeated three times.

16. The aircraft had several interior parts damaged such as detached ceiling, broken passenger service units and oxygen mask container dropped.
17. Eleven injured occupants were hospitalized for further treatment and the 22 others were allowed to return home.

3 SAFETY ACTION

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

4 SAFETY RECOMMENDATIONS

According to factual information and initial findings, the Komite Nasional Keselamatan Transportasi issued safety recommendations to address the safety issues identified in this preliminary report to the Etihad Airways.

- **04.O-2016-58.1**

To enhance the safety reminder for passenger to fasten the seatbelt while seating even though the seatbelt sign is off.

- **04.O-2016-59.1**

To ensure the pilot implementation of the procedures describes in Operations Manual Part-A subchapter 12.12 regarding the declaration of abnormal situation.