



AIRCRAFT ACCIDENT REPORT

MEA-TURKISH/2020/07/29/F

Accident Investigation Bureau

**Final Report on the serious incident involving Airbus 330-243 aircraft operated by Middle East Airlines with nationality and registration marks OD-MEA and a parked Boeing 777 aircraft operated by Turkish Airlines with nationality and registration marks TC-LJC which occurred at Murtala Muhammed International Airport, Lagos
On 29th July, 2020**



This report is produced by the Accident Investigation Bureau (AIB), Nnamdi Azikiwe International Airport, Abuja.

The report is based upon the investigation carried out by Accident Investigation Bureau, in accordance with Annex 13 to the Convention on International Civil Aviation, Nigerian Civil Aviation Act 2006, and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2019.

In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of aircraft accident/serious incident investigations to apportion blame or liability.

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Safety Recommendations in this report are addressed to the Regulatory Authority of the State (NCAA) as well as other stakeholders, as appropriate. The Regulatory Authority is the authority that ensures implementation and enforcement.

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

AIB-N	Accident Investigation Bureau, Nigeria
APP	Approach Control
ATC	Air Traffic Control
ATPL (A)	Airline Transport Pilot Licence (Aeroplane)
CVR	Cockpit Voice Recorder
CT	Control Tower
DNMM	ICAO Location Indicator for Murtala Muhammed Airport Lagos
FAAN	Federal Airports Authority of Nigeria
FDR	Flight Data Recorder
h	hour
IFR	Instrument Flight Rules
Kt	Knot
NAMA	Nigerian Airspace Management Agency
NCAA	Nigerian Civil Aviation Authority
PF	Pilot Flying
PM	Pilot Monitoring
UTC	Coordinated Universal Time

Aircraft accident report number:	MEA-TURKISH/2020/07/29/F
Registered owners/operators:	i) Middle East Airlines ii) Turkish Airlines Inc.
Aircraft type and model:	i) Airbus 330-243 ii) Boeing777-3F2ER
Manufacturers:	i) Airbus Industry, France ii) Boeing Company, USA
Year of manufacture:	i) 2009 ii) 2015
Serial number:	i) 0984 ii)44123
Nationality and registration marks:	i) OD-MEA ii) TC-LJC
Location:	E55 parking bay at International Apron, Murtala Muhammed Airport, Lagos
Date and time:	29th July, 2020 at about 17:23 h

*(All times in this report are
local time, equivalent to UTC
+ 1 unless otherwise stated)*

SYNOPSIS

Accident Investigation Bureau, Nigeria (AIB-N) was notified of the serious incident by Turkish Airlines Inc. on 29th July, 2020. Investigators were dispatched same day. All relevant stakeholders were notified.

On 29th July, 2020 at 17:14 h, an Airbus 330-243 aircraft with nationality and registration marks OD-MEA, operated by Middle East Airlines - Air Liban with call sign MEA572 contacted Control Tower for a departure clearance from the international wing of Murtala Muhammed Airport (DNMM), Lagos to Beirut Rafic Hariri International Airport (OLBA), Lebanon on an Instrument Flight Rules (IFR) flight plan. There were 245 persons on board including 16 flight crew members.

MEA572 requested push back and start-up which was approved. MEA572 later requested taxi and was instructed to taxi to holding point runway 18R.

At 17:25 h while taxiing, the crew noticed the protrusion of a parked B777 aircraft on the taxi way F3 and in trying to avoid the aircraft, the left wingtip clipped the tail section of the APU and the horizontal stabilizer of the B777 aircraft. The crew informed ATC of the collision with the B777 and were instructed to hold position, and await the arrival of the wing-walker to direct them properly.

At 17:28 h, MEA572 reported going to shut down and standby. The crew shut down the engine and passengers disembarked without any injury.

The investigation identified the following:

Causal factor

The action of the Middle East Airline crew in deviating from the yellow marking of the lead out taxi lane of ITZ Apron in an attempt to avoid collision with the stationary TC-LJC at bay E55.

Contributory factor

1. Turkish airline TC-LJC was parked short of the B777 designated stop line marking point on the apron by about 13.5m.
2. Inadequate safety oversight on NAHCO apron operations by FAAN

Two Safety Recommendations were made.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 29th July, 2020 at 17:14 h, an Airbus 330-243 aircraft with nationality and registration marks OD-MEA, operated by Middle East Airlines - Air Liban with call sign MEA572 contacted Control Tower for a departure clearance from the international wing of Murtala Muhammed Airport (DNMM), Lagos to Beirut Rafic Hariri International Airport (OLBA), Lebanon on an Instrument Flight Rules (IFR) flight plan. There were 245 persons on board including 16 flight crew members.

At 17:15 h, MEA572 requested push back and start-up which was approved. MEA572 later requested taxi and was instructed to taxi to holding point runway 18R.

From the voyage report, the pilot stated as follows "TAXIWAY F3 ONE-WAY TAXIWAY OUT, NOTICED TURKISH B777 PARKED GATE E55 TAXIED VERY SLOWLY LOOKING OUT, DEVIATED SLIGHTLY TO THE RIGHT FOR EXTRA CLEARANCE [*BUT*] THE LEFT WINGTIP HIT PARKED B777 TAIL CONE STOPPED IMMEDIATELY SHUTDOWN ENGINES".

At 17:25 h from the ATC transcript, MEA572 reported "the triple seven was parked too far away we were very careful but we hit the tail section of the Turkish. Advice crew please and bring Fire Brigade on standby please". ATC instructed the crew to hold position, as the wing-walker was coming towards the aircraft to direct them properly.

At 17:27 h MEA572 confirmed getting direction from the wing-walker to Tower and then requested to return to the gate because of the damage to the winglet.

At 17:28 h, MEA572 reported going to shut down and standby. The crew shut down the engines and passengers disembarked without any injury.

The incident occurred in daylight.

1.2 Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor	Nil	Nil	Nil
None	16	229	245
Total	16	229	245

1.3 Damage to aircraft

OD-MEA was slightly damaged.

1.4 Other damage

TC-LJC was substantially damaged.

1.5 Personnel information

1.5.1 Pilot

Nationality:	Lebanese
Age:	48 years
License type:	Airline Transport Pilot License (Aeroplane)
License:	Valid till 31st October, 2020
Medical Certificate:	Valid till 31st October, 2020
Aircraft ratings:	Boeing 707, Airbus 320, Airbus 330-243
Total flight time:	16,916:45 h

Hours on type:	3,299:25 h
Hours as PIC:	656:11 h
Last 90 days:	57:11 h
Last 28 days:	32:06 h
Last 24 hours:	06:42 h

1.5.2 Co-Pilot

Nationality:	Lebanese
Age:	31 years
License type:	Airline Transport Pilot License (Aeroplane)
License:	Valid till 31st September, 2020
Medical Certificate:	Valid till 21st January, 2021
Aircraft ratings:	Airbus 320, Airbus 330-243
Total flight time:	2,691 h
Hours on type:	634:07 h
Last 90 days:	45:28 h
Last 28 days:	11:58 h
Last 24 hours:	00:00 h

1.6 Aircraft information

1.6.1 General information

Manufacturer:	Airbus Industrie, France
Type:	Airbus A330-243
Serial number:	0984

Year of manufacture:	2009
Certificate of registration:	February 2009
Certificate of Airworthiness:	valid till 4th February, 2021
Certificate of Insurance:	valid till 30th June, 2021
Total airframe time:	41,796 h
Total landing cycle:	13,989

1.6.2 Powerplant

	No.1	No.2
Manufacturer:	Rolls Royce	Rolls Royce
Type:	Trent 772B-60/16	Trent 772B-60/16
Serial number:	41533	41605
Time since new:	40,653 h	37,915 h
Cycles since new:	13,039	12,049
Type of fuel used:	Jet A1	

1.7 Meteorological information

Not applicable.

1.8 Aids to navigation

Not applicable.

1.9 Communications

There was effective communication between the aircraft and ATC units. The status of the equipment on the day of the occurrence were as follows:

Lagos Radar/Approach Control	VHF 124.7 MHz:	-S-
Lagos Area Control	VHF 127.3 MHz:	-S-
Lagos Tower Control	VHF 118.1 MHz:	-S-
Lagos Ground Control	VHF 121.9 MHz:	-S-

1.10 Aerodrome information

The aerodrome has four runways 18L/36R and 18R/36L serving both the domestic and international wing of the airport.

The airport elevation is 135 ft and runway length of 18L/36R is 9,006 ft (2,745 m) while 18R/36L is 12,795 ft (3,900 m).

The Air Traffic Control Tower is located above the International Apron.

The airport is rated CAT 9 in fire coverage capabilities.

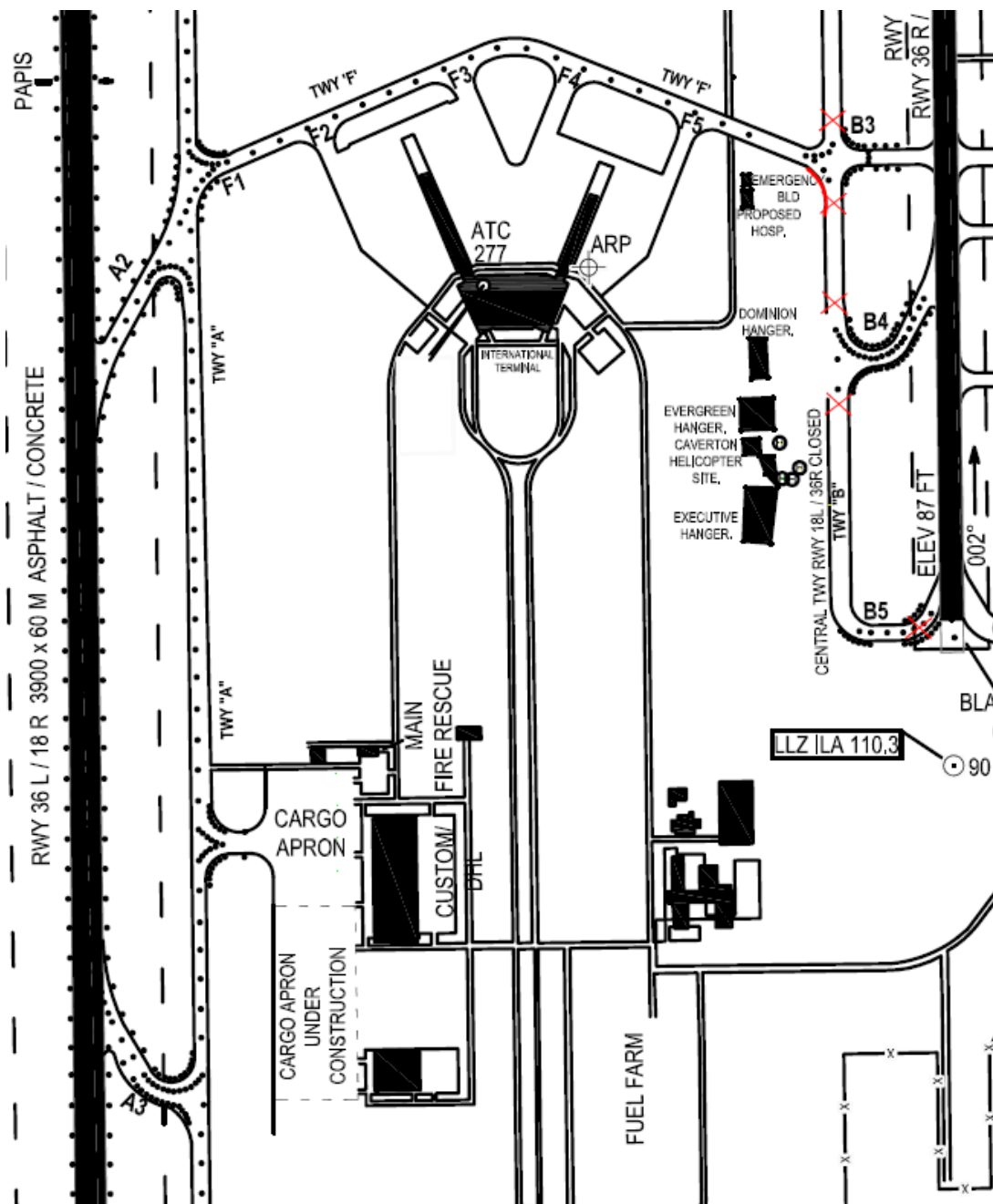


Figure 1:The layout of the Murtala Muhammed Airport

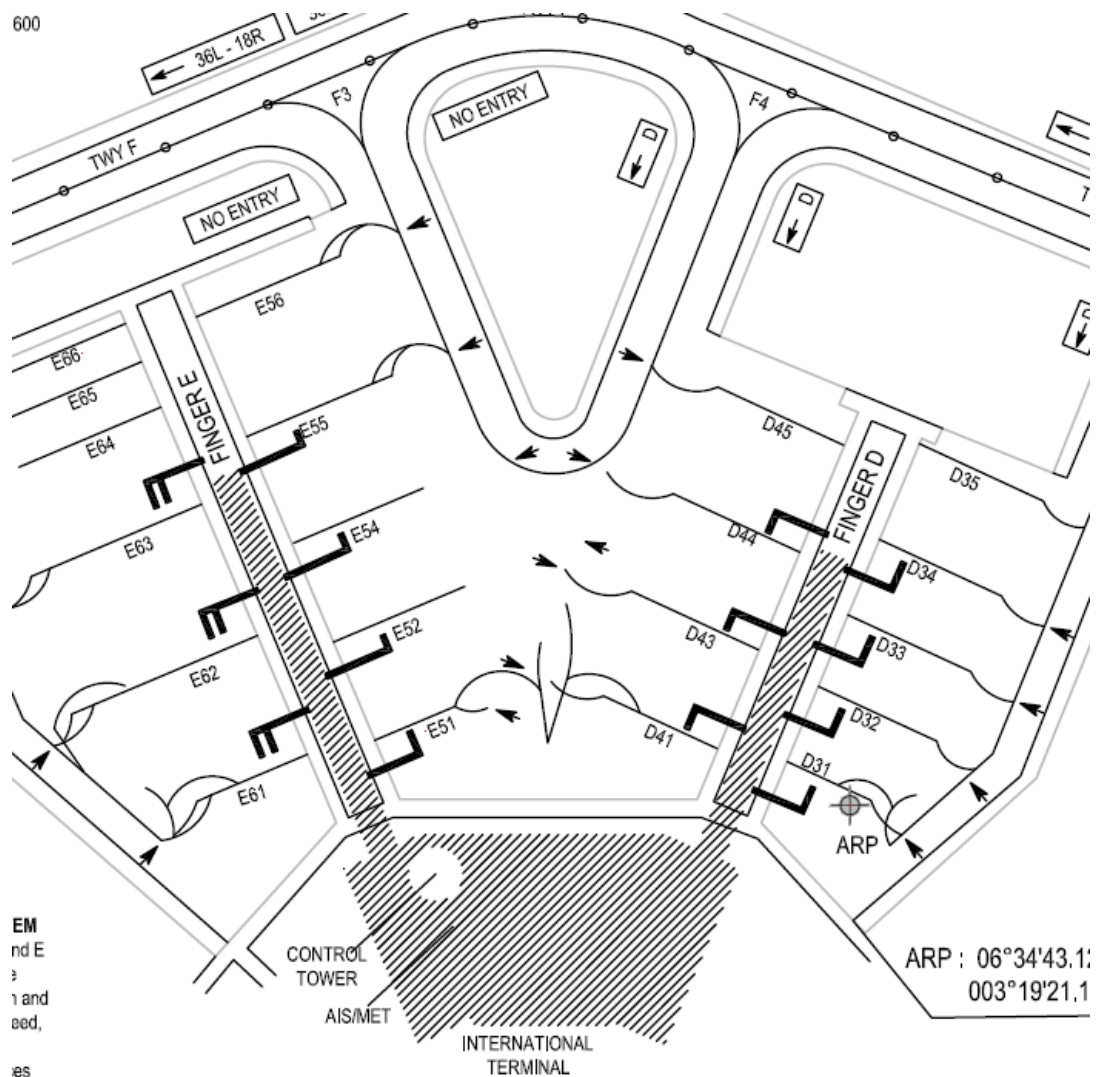


Figure 2: The layout of the parking bays at Murtala Muhammed Airport

1.11 Flight recorders

The aircraft (OD-MEA) is fitted with Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) with the following details:

	Flight Data Recorder	Cockpit Recorder	Voice
Manufacturer	Honeywell, USA	Honeywell, USA	
Model	SSFDR	SSCVR	
Part number	980-4700-042	980-6022-001	
Serial number	SSFDR-13655	CVR120-13688	

However, the recorders were neither downloaded nor analyzed.

1.12 Wreckage and impact information

The left winglet of MEA572 impacted, cut into the APU exhaust area and damaged the right horizontal stabilizer of the parked Turkish Airlines Boeing 777-300 at bay E55 while taxiing on the Apron. The left winglet of the MEA572 Airbus 330-243 was also damaged.

Post occurrence measurements showed that the Turkish airline aircraft TC-LJC was parked short of the designated marking point of B777 on the apron by about 13.5 m while the Middle East Airline OD-MEA deviated to the right of the lead yellow line marking on the apron by about 6.5 m.



Figure 3: MEA572 aircraft winglet clipped the APU exhaust of the Turkish aircraft



Figure 4: Damaged APU exhaust area of the Turkish Airlines aircraft



Figure 5: A close-up of the impact

1.13 Medical and pathological information

No medical or pathological test was conducted on the cockpit crew.

1.14 Fire

There was no fire.

1.15 Survival aspect

The occurrence was survivable because there was livable volume of space and restraint system such as seat belts and shoulder harnesses were intact.

1.16 Tests and research

Not applicable.

1.17 Organizational and management information

1.17.1 Middle East Airlines

Middle East Airlines (MEA) is the national flag carrier of Lebanon and has its headquarters in Beirut. The airline commenced its operations in January 1946 and its base is at Rafic Hariri International Airport, Beirut (OLBA). MEA (excluding Cedar Executive) operates an all-Airbus fleet.

1.17.2 Turkish Airlines

Turkish Airlines (Turkish: *TürkHavaYolları*) is the national flag carrier airline of Turkey. It commenced operations on May 1933 and currently has a fleet size of 364 including 24 cargo aircraft. Its fleet consists of the Boeing and Airbus aircraft.

The airline's corporate headquarters is at the Turkish Airlines General Management Building on the grounds of Istanbul Atatürk Airport in Yeşilköy, Bakırköy, Istanbul. Istanbul Airport in Arnavutköy is the airline's main base, and there are secondary hubs at Ankara Esenboğa Airport and İzmir Adnan Menderes Airport.

1.17.3 Federal Airports Authority of Nigeria (FAAN)

Federal Airports Authority of Nigeria (FAAN) is a service organization statutorily charged to manage all Commercial Airports in Nigeria and provide service to both passenger and cargo airlines.

Duties/Functions of FAAN

FAAN is entrusted with the following functions:

- *To develop, provide and maintain airports, necessary services and facilities for safe, orderly, expeditious and economic operation of Air Transport.*
- *To provide adequate conditions under which passengers and goods may be carried by air and under which aircraft may be used for other gainful purpose and prohibiting the carriage by air goods of such classes as may be prescribed.*
- *To charge for services provided by the authority at airports.*
- *To provide accommodation and other facilities for the effective handling of passengers and freight.*
- *To develop and provide facilities for surface transportation within airport.*
- *To carry out at the airports (either by itself or by an agent or in partnership with any other person) economic activities that are relevant to airport.*
- *To carry out at the airports (either by itself, its agents or in partnership with any other person) such other commercial activities which are not relevant to air transport.*
- *To provide adequate facilities and personnel for effective security at all airport.*

Generally, to create conditions for the development in the most economic and efficient manner of air transport and the services connected with it.

1.17.3.1 Aerodromes Regulations (Nig CARs Part 12, section 4.9 - Apron management)

Particulars of the apron management procedures, including the following:

- a) arrangements between Air Traffic Control and the apron management units;*

- b) arrangements for allocating aircraft parking positions;*
- c) arrangements for initiating engine start and ensuring clearance of aircraft push back*
- d) marshalling service;*
- e) leader (van) service.*

1.17.4 NAHCO Aviance

NAHCO Aviance is a registered aviation handling company established in 1979. It provides aviation cargo, aircraft handling, passenger facilitation, crew transportation, refueling and aviation training services from its base at Murtala Muhammed International Airport. NAHCO Aviance serves over 35 airlines throughout seven airports across Nigeria, handling approximately 70% of domestic and foreign airlines operating into the country.

NAHCO Aviance is the handling company of Turkish airline.

1.17.5 Nigerian Airspace Management Agency (NAMA)

Nigerian Airspace Management Agency (NAMA) provides the following services:

Air Traffic Control Service (ATCS), Air Traffic Advisory Service, Alerting Service and Flight Information Service.

Air Traffic Control Service (ATCS), presently referred to as Air Traffic Management (ATM) is a service provided for the purpose of preventing collisions between aircraft; on the manoeuvring area, between aircraft and obstructions; and to expedite and maintain an orderly flow of traffic. ATCS is sub-divided into Area Control Service, Approach Control Service and Aerodrome Control Service.

1.17.5.1 Traffic avoidance advice

Advice provided by an air traffic service unit specifying manoeuvres to assist a pilot to avoid collision.

Functions of Aerodrome Control towers

ICAO Doc.4444 PANS-ATM: Procedure for Air Navigation Services and Air Traffic Management Chapter 7 paragraph 7.1.1.2 states,

“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. Watch shall be maintained by visual observation, augmented in low visibility conditions by an ATS surveillance system when available”.

1.18 Additional information

On 29th July, 2020 at about 15:14 h, a Turkish Airline B777-3F2ER aircraft with nationality and registration marks TC-LJC, flight number THY6108, arrived Lagos as a cargo flight with 8 persons onboard, and was instructed by ATC to proceed to the cargo ramp.

However, at 15:18 h with no available parking position at the cargo ramp, THY6108 requested ATC to confirm the parking position in cargo ramp, and stated “We see the Marshaller showing us like it’s in the international apron”. ATC informed THY6108 to standby to verify the information.

At 15:19 h, ATC instructed THY6108 to proceed to the international apron of Murtala Muhammed airport due congestion at the cargo apron. The aircraft taxied towards parking bay E51 but was redirected to E55, where a Marshaller was stationed.

The Marshaller stopped THY6108 operating under its own power before it got to the designated stop line marking on the apron and handed it over to NAHCO Aviance, the ground handling company for repositioning to the designated stop line marking.

The report from NAHCO Aviance Equipment Operative Coordinator stated "...after the flight engineer had done his spot checks offloading commenced ASAP at about 15:48 h".

Middle East Airlines MEA571 an airbus 330-243 aircraft with nationality and registration marks OD-MEA, arrived Lagos at 15:58 h with 73 persons onboard and was directed by ATC to parking bay E51.

1.18.1 Swiss cheese model

The Swiss Cheese model of accident causation, originally proposed by James Reason, likens human system defenses to a series of slices of randomly-holed Swiss Cheese arranged vertically and parallel to each other with gaps in-between each slice.

Reason hypothesizes that most accidents can be traced to one or more of four levels of failure:

- Organizational influences,
- Unsafe supervision,
- Preconditions for unsafe acts, and
- The unsafe acts themselves.

In the Swiss Cheese model, an organization's defenses against failure are modelled as a series of barriers, represented as slices of the cheese. The holes in the cheese slices represent individual weaknesses in individual parts of the system, and are continually varying in size and position in all slices. The system produces failure

when holes in all of the slices momentarily align, permitting "a trajectory of accident opportunity", so that a hazard passes through holes in all of the defenses, leading to an accident.

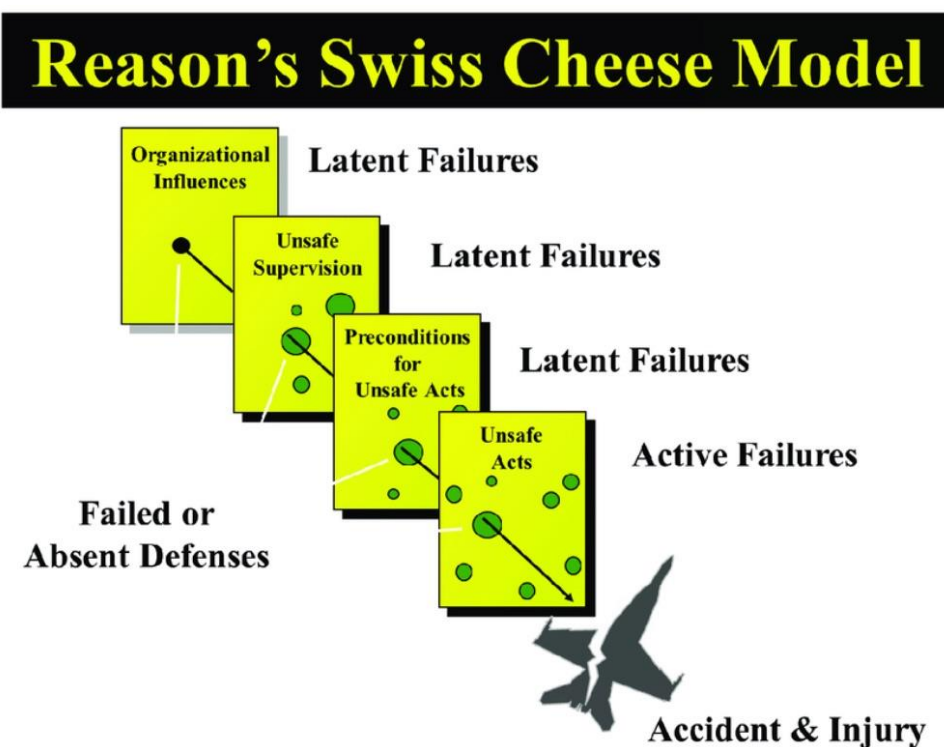


Figure 6: Swiss Cheese Model showing a trajectory of accident opportunity

2.0 ANALYSIS

2.1 General

The crew were qualified and certified to operate the flight.

The analysis will focus on the responsibilities of relevant stakeholders at ensuring safe aircraft operation on the Apron and maneuvering areas.

2.2 Parking of Turkish Airline aircraft

The Turkish Airline B777-3F2ER operated as flight number THY6108 arrived Lagos as a cargo flight. The ATC transcript showed that the aircraft was meant to be parked at the cargo ramp but re-directed to the international Apron due congestion on the cargo ramp.

The Marshaller parked the aircraft at Bay E55 of the international Apron but stopped it before it got to the designated stop-line marking for B777 aircraft on the Apron by about 13.5 m.

Post-occurrence site inspection revealed that the aircraft tail section protruded into the taxi-way F3.



Figure 5: Turkish Airline B777-3F2ER aircraft parked at E51

2.3 The Taxi

Middle East Airline aircraft, OD-MEA requested push back and start-up clearance from ATC and were granted. Afterwards, the crew requested for taxi clearance and was also granted. While taxiing out on the Apron via taxiway F3 to the holding point runway 18R, the crew noticed the parked Turkish Airline aircraft, TC-LJC with the tail section protruding into the taxiway and decided to deviate from the yellow leading line to the right by about 6.5 m in order to avoid impact.

However, in the process of taxiing further, the left winglet of OD-MEA impacted, cut into the APU exhaust area of TC-LJC and also damaged its horizontal stabilizer. The crew of OD-MEA should not have deviated from the leading yellow line when in doubt of safe taxiing behind the parked TC-LJC. They should have instead stopped the aircraft and requested the ATC for a wing walker or a tow truck.



Figure 6: The deviation of MEA572 airlines aircraft from the taxi line

2.4 Safety of aircraft operation on the apron

In the Swiss Cheese model of accident causation, an accident happens when all layers have holes through which the series of events that James Reason calls an 'accident trajectory' is able to pass. The slices are the layers of defense. The defenses can be any action, policy or barrier put in place.

2.4.1 Aerodrome Control Service

Aerodrome Control Services is a unit of Air Traffic Control Service (ATCS) which issues instructions and clearances to aircraft under their control for safe, orderly and expeditious flow of air traffic on and in the vicinity of an aerodrome with the objective of preventing collision between aircraft.

From ATC transcript made available to the Bureau, investigation revealed that there was no evidence of issuance of caution on taxi due parked Turkish B777 aircraft TC-LJC at Gate E55 to the flight crew of OD-MEA during taxi. This could have afforded the flight crew the safer way to taxi the aircraft out of the apron. A continuous watch should be maintained by the aerodrome control tower unit during all flight operations.

2.4.2 Ground handling

The practice for handling passenger aeroplanes are different from those of cargo planes at the Murtala Muhammed International Airport Apron.

In handling passenger aeroplane, a Marshaller, who is an employee of FAAN directs an arriving aircraft operating under its own power to an allocated parking slot and stop it before the designated marking point for the aircraft type on the Apron to avoid engine collision with the aviobridge.

Thereafter, the ground handling company's engineer/personnel tow the aircraft to the appropriate designated marking point.

However, in this case, this was not done as post incident inspection showed that TC-LJC was parked 13.5m short of the designated marking point, thereby constituting an obstacle to OD-MEA taxiing behind it.

At the time of this occurrence, NAHCO Aviance did not have in its Operations Manual any approved procedures for the handling of cargo aircraft at the International Terminal Zone (ITZ) apron of the Murtala Muhammed International Airport (MMIA), which is designated as a passenger apron only or the open bays.

2.4.3 FAAN Operations (Airfield Services)

The activities of FAAN's department of Operations (Airfield Services) at ensuring effective, efficient, orderly and safe aircraft operations on the Apron are crucial as it co-ordinates activities on the airside to ensure aircraft operations are carried out in line with ICAO standards and safety procedure.

The three units in the department; Apron Control, Airfield Operations and Marshalling played major roles in this occurrence. Apron Control is responsible for the allocation of parking bay. Apron control officer gets information about available parking bays from marshaller which is passed to ATC to relay to the flight crew. There was poor coordination within the apron control unit in the allocation of parking bay for the Turkish aircraft. After landing, TC-LJC taxied to the cargo apron for parking but due to congestion was directed to bay E51 at international terminal apron and re-directed to E55 after getting to E51. The marshaller stopped the aircraft before the designated stop marking point for Boeing 777 on the Apron which is the usual practice in order to avoid engine collision with the aviobridge.

FAAN's S.O.P FOR PARKING /OFFLOADING CARGO ON ITZ APRON states among others as follows:

“Marshalar and AOO (Airfield Operations Officer) must ensure that the aircraft is well parked to align to its stop line”.

“AOO should always monitor to ensure that parked aircraft are properly docked to align at their designated stop line marking and to ensure that minimum separation distance clearance between the aircraft stand centre taxi lane and aircraft taxi lane centre line on the Apron is maintained”

Had the Airfield Operations Officers carried out their monitoring roles on the Apron as expected, the incident might have been prevented.

3.0 CONCLUSIONS

3.1 Findings

1. The crew of OD-MEA were qualified to conduct the flight.
2. At about 15:14 h Turkish Airline B777-3F2ER aircraft landed DNMM as a cargo flight.
3. ATC instructed TC-LJC to proceed to the international apron of Murtala Muhammed airport due congestion at the cargo apron. The aircraft taxied towards parking bay E51 but was redirected to E55, where a Marshaller was stationed.
4. The Marshaller stopped TC-LJC before it got to the designated stop line marking on the apron.
5. The Marshaller handed over TC-LJC to NAHCO Aviance for repositioning to the designated stop line marking.
6. The Turkish airline TC-LJC was parked 13.5m short of the stop line marking on the Apron.
7. On landing at 15:58 h, ATC instructed OD-MEA inbound DNMM to proceed, parking gate E51.
8. At 17:15 h, OD-MEA outbound from DNMM requested for push back and start up clearance.
9. At 17:22 h, OD-MEA requested taxi from ATC and was instructed to taxi to holding point runway 18R.
10. OD-MEA while taxiing out of the Apron the left winglet impacted, cut into the APU exhaust area and damaged the right horizontal stabilizer of TC-LJC belonging to Turkish Airline.

11. OD-MEA maneuvered about 6.5 m right of the yellow track on the apron in an attempt to avoid collision with the stationary TC-LJC.
12. At 17:25 h, OD-MEA reported the occurrence to ATC.
13. NAHCO is the ground handling company for Turkish Airline.

3.2 Causal factor

The action of the Middle East Airline crew in deviating from the yellow marking of the lead out taxi lane of ITZ Apron in an attempt to avoid collision with the stationary TC-LJC at bay E55.

3.2 Contributory factor

1. Turkish airline TC-LJC was parked short of the B777 designated stop line marking point on the apron by about 13.5m.
2. Inadequate safety oversight on NAHCO apron operations by FAAN

4.0 SAFETY RECOMMENDATIONS

4.1 Safety Recommendation 2022....019

The Directorate General of Civil Aviation (DGCA), Lebanon, should ensure that Middle East Airlines (MEA) observes the best international safety taxiing procedures by requesting ATC for assistance when necessary.

4.2 Safety Recommendation 2022....020

FAAN should ensure that NAHCO Aviance develop and incorporate procedures for the handling of cargo aircraft at the ITZ and the Open Bay of the MMIA in its Operations Manual.

SAFETY ACTIONS

Federal Airports Authority of Nigeria (FAAN) has updated its Standard Operating Procedure for Parking/offloading Cargo flights on ITZ Apron as a result of this occurrence to include, among other things:

1. Offloading cargo flights parked at Aviobridge on ITZ Apron is prohibited. The cargo flight should wait until there is parking space on HCT Apron, or when an open bay is vacant at ITZ, to accommodate it.
2. Marshalls should ensure that all wide-bodied aircraft are towed up to the mark , before they exit the bay.