FINAL INVESTIGATION REPORT

SERIOUS INCIDENT OF EMIRATES FLIGHT EK 615, BOEING 777-31(ER) AIRCRAFT, REGISTRATION NO A6-END AT BENAZIR BHUTTO INTERNATIONAL AIRPORT, ISLAMABAD ON 27TH FEBRUARY, 2018

Dated: 30th October, 2023

SCOPE

Aircraft Accident Investigation Board (AAIB), Pakistan conducts investigations in accordance with Annex-13 to Convention on International Civil Aviation and Civil Aviation Rules 1994 (CARs 94).

The sole objective of the investigation and the final report of an accident or incident under above stated regulations is the prevention of future accidents and incidents of similar nature. It is not the purpose of such an investigation to apportion blame or liability. Accordingly, it is inappropriate to use AAIB Pakistan investigation reports to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

This report contains facts which have been determined up to the time of publication. Such information is published to inform the aviation industry and the public about the general circumstances of civil aviation accidents and incidents.

Extracts may be published without specific permission provided that the source is duly acknowledged, and the material is reproduced accurately, and is not used in a derogatory manner or in a misleading context.

TABLE OF CONTENTS

SECTION 1 - FACTUAL INFORMATION 8
1.1. History of the Flight 10
1.2. Injuries to Person(s) 10
1.3. Damage to Aircraft 10
1.4. Other Damages 12
1.5. Personnel Information 12
1.6. Aircraft Information 12
1.7. Meteorological Information 12
1.8. Aids to Navigation 12
1.9. Communications 12
1.10. Aerodrome Information 13
1.11. Flight Recorders 13
1.12. Wreckage and Impact Information 13
1.13. Medical and Pathological Information 13
1.14. Fire 13
1.15. Survival Aspects 13
1.16. Test & Research 13
1.17. Organizational and Management Information 15
1.18. Additional Information 16
1.19. Useful & Effective Investigation Techniques 16
SECTION 2 – ANALYSIS 17
2.1. General 18
2.2. Ambulift Vehicle 18
2.3. Ambulift Operator 20
2.5. Flight Operations 21
2.6. Aircraft 21
2.7. Human Factors 21
SECTION 3 – CONCLUSIONS 23
3.1. Findings 24
3.2. Causes / Contributing Factors 25
SECTION 4 – SAFETY RECOMMENDATIONS 27
4.1. Safety Recommendations 28

LIST OF FIGURES

Figure 1 Ambulift Fallen on Ground Infront of Engine No. 2 10
Figure 2 Ambulift in Contact with Engine No. 2 Cowling..... 11
Figure 3 Damaged Air Inlet Cowl of Engine No. 2 (Front View)..... 11
Figure 4 Damaged Air Inlet Cowl of Engine No. 2 (Side View)..... 11
Figure 5 Inside View of Van Box After the Serious Incident 12
Figure 6 Main Parts of Ambulift 19

ABBREVIATIONS

AAIB	Aircraft Accident Investigation Board
ADP	Apron Driving Permit
APM	Airport Manager
AVP	Apron Vehicle Permit
BBIAP	Benazir Bhutto International Airport
COO	Chief Operating Officer
GHA	Ground Handling Agency
h	Hour(s)
ICAO	International Civil Aviation Organization
IOU	Incident and Occurrence Unserviceability Report
LT	Local Time
MAS	Manager Airside
PCAA	Pakistan Civil Aviation Authority
SOP	Standard Operating Procedures
UTC	Universal Time Coordinated

INTRODUCTION

The serious incident was reported by Pakistan Civil Aviation Authority (PCAA) Incident Occurrence and Unserviceability (IOU) Report. The serious incident was notified in accordance with International Civil Aviation Organization (ICAO) Annex-13. Ministry of Aviation, Government of Pakistan issued Notification to constitute an Investigation Team to investigate the serious incident. The investigation has been conducted by AAIB, Pakistan.

SYNOPSIS

On 27th February, 2018 at 21:45 hours (h) UTC (0245 LT), while embarking passengers with disabilities on Emirates flight EK 615, Registration No. A6-END, Boeing 777-31ER aircraft, at Benazir Bhutto International Airport (BBIAP), Islamabad, Gerry's Dnata's (Ground Handling Agency – GHA) ambulift No. GD-52 toppled and collided with air inlet cowl of Engine No. 2 and then fell on the ground with 04 (four) passengers inside. Ambulift collision with Engine No. 02 caused damage to its cowling at two points. All the passengers sustained injuries and they were shifted to the nearest hospital immediately. Investigation revealed that the arm-braces of the ambulift were not extended, when van box was lifted to load the passengers on the aircraft, which caused the ambulift to become unbalanced and toppled.

INTENTIONALLY LEFT BLANK

SECTION 1 - FACTUAL INFORMATION

1.1. History of the Flight

1.1.1. On 27th February, 2018 Emirates flight EK 615, Registration No. A6-END was parked at BBIAP, Islamabad, scheduled for departure to Dubai International Airport, Dubai from BBIAP, Islamabad.

1.1.2. At 21:45 h UTC (0245 LT), ambulift No. GD-52 toppled during the passengers (with disabilities) embarkation process. The vehicle collided and damaged air inlet cowl of Engine No. 2 and then fell on ground with 04 (four) passengers inside.

1.1.3. 04 (four) passengers and 01 (one) ground handling staff sustained injuries and they were shifted to the nearest hospital immediately.

1.2. Injuries to Person(s)

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	04	01
Minor	-	-	-
None	-	-	-
Total		04	01

Table 1 Details of Injuries to Persons

1.3. Damage to Aircraft

1.3.1. The aircraft sustained minor damage due to ambulift collision with the air inlet cowl of Engine No. 2.

Figure 1 Ambulift Fallen on Ground Infront of Engine No. 2

Figure 2 Ambulift in Contact with Engine No. 2 Cowling

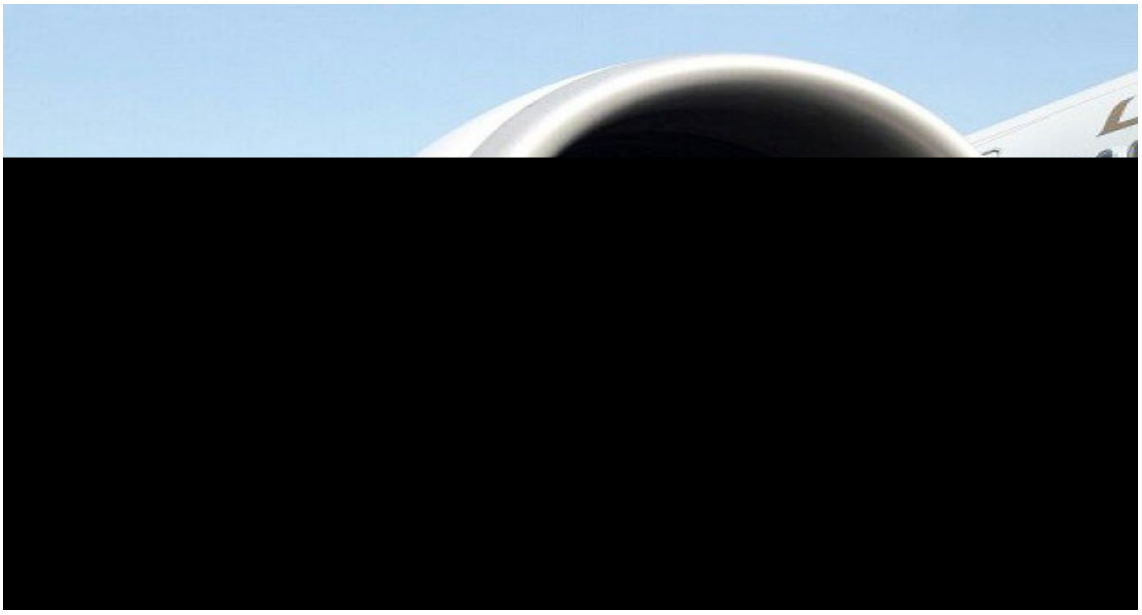


Figure 3 Damaged Air Inlet Cowl of Engine No. 2 (Front View)

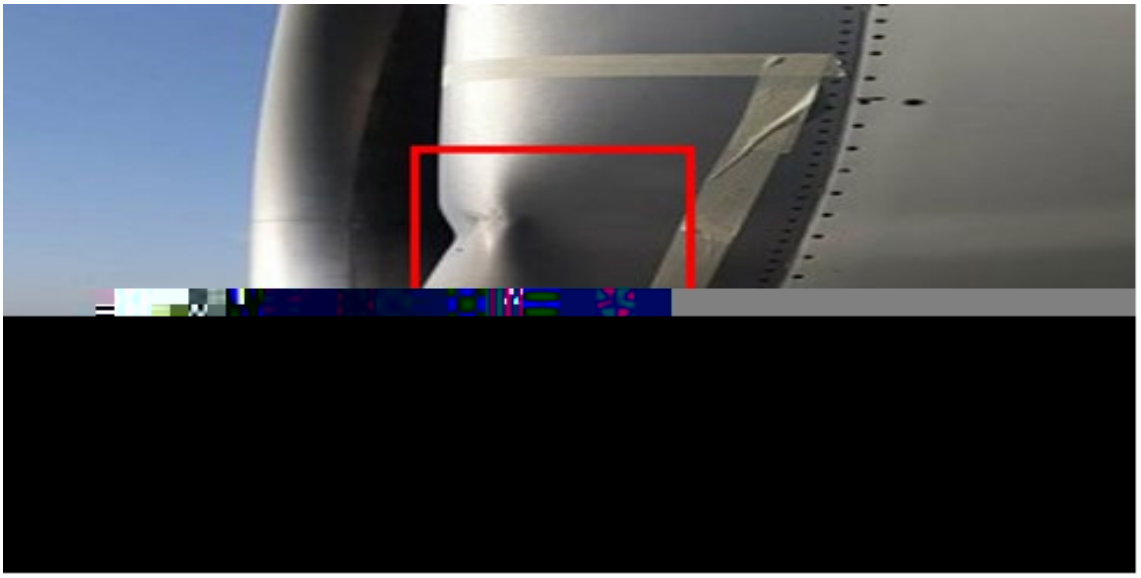


Figure 4 Damaged Air Inlet Cowl of Engine No. 2 (Side View)

1.10. Aerodrome Information

1.10.1. Not Applicable.

1.11. Flight Recorders

1.11.1. Not Applicable.

1.12. Wreckage and Impact Information

1.12.1. Not Applicable.

1.13. Medical and Pathological Information

1.13.1. The medical examination report of the ambulift operator after this serious incident indicated positive results for Marijuana / Cannabis and Alcohol.

1.14. Fire

1.14.1. Not Applicable.

1.15. Survival Aspects

1.15.1. Not Applicable.

1.16. Test & Research

1.16.1. The following were the governing documents for ensuring smooth and efficient conduct of ground operations by GHA at BBIAP, Islamabad. The relevant contents have been reproduced.

1.16.2. **Standard Operating Procedure (SOP-004-RNAS-2.0) – "Apron Management Personnel, Vehicle Operation on the Movement Area" at BBIAP Islamabad**

1.16.2.1. **Purpose**

(a) This SOP provides general instructions for movement of authorized personnel and vehicles on apron / airside at BBIAP, Islamabad.

(b) Issuance of various permits to authorized operation of personnel and vehicles on the movement area at airside.

1.16.2.2. **Responsibility**

(a) The Manager Airside (MAS) is responsible to Airport Manager (APM), BBIAP, Islamabad for overall efficiency of airside operation at BBIAP, Islamabad and its administration.

(b) No person shall operate a motor or other vehicle while under the influence of alcohol liquor or drugs to an extent that his ability to operate the vehicle is impaired.

(c) All vehicles / equipment plying on apron shall be serviceable in all respect and any defect particularly oil leakage will be checked by CAA, failing which CAA will stop operation of such defective vehicle / equipment on risk and at cost of the owner.

1.16.2.3. **Use of Alcohol Liquor or Drugs**

(a) Persons deployed on apron, baggage areas, equipment areas, workshops and hangers shall not be under the influence of alcohol liquor or drugs. It shall be noted that such acts are prohibited in airport-restricted areas.

1.16.2.4. **Apron Vehicle Permits (AVP) Power Driven**

(a) Apron Vehicle Permit (AVP) – Permanent / Annual – Apron Vehicle Permit (AVP) shall be mandatory for all vehicles to be deployed on the apron.

(b) Apron Vehicle Permits shall be issued for only those vehicles, which are essentially required for aircraft operations.

1.16.2.5. **Apron Driving Permits (ADP)**

(a) All the personnel deployed on driving duties on the movement area should possess ADP issued by the MAS / APM CAA, BBIAP Islamabad.

1.16.2.6. **Other Restriction on ADP / AVP**

(a) A separate vehicle / driving permit shall be obtained for each vehicle / driver / official.

(b) Airline operators / Handling agents and all other agencies shall ensure the officials deployed on apron driving duties are: -

(i) Physically Fit

(ii) Medically Fit

(iii) Eyesight with or without glasses is 6/6, and the same has been verified by Eyes Specialist and Physician.

1.16.2.7. Manager Airside shall ensure that no official / vehicle operate on the apron without ADP / AVP. Airside Inspectors shall frequently inspect and observe the vehicular traffic to ensure adherence/ compliance of the procedures.

1.16.3. **PCAA AIRWORTHINESS NOTICE (AWNOT-024-AWXX-2.0) – "Ground Power Units and Ramp Handling Equipment"**

1.16.3.1. The Airworthiness Notice was issued to ensure compliance with safety requirements prescribed for handling of ground power unit and ramp handling equipment.

1.16.3.2. The Airworthiness Notice is applicable to all aviation operators and aircraft handling agencies operating and utilizing ground power units and ramp handling equipment

1.16.3.3. All operators are required to observe following safety requirements.

(a) All electrical / mechanical safeties of the equipment must be ensured.

(b) Passenger steps, Cargo loading vehicles, catering vans and ambulifter must have ground stabilizers for proper balance and safety while in use on aircraft to avoid auto ascending of unit.

(c) All ramp handling equipment must be marshalled while installing and removing from the aircraft.

1.16.3.4. Airworthiness field offices may carry out periodic checks to ensure that only suitable, qualified and appropriately trained / licensed manpower is deployed to operate such equipment on the apron.

1.17. Organizational and Management Information

1.17.1. Gerry's Dnata is registered as Ground Handling Agency (GHA) with PCAA which provides ground handling service to various airlines operating in Pakistan. It maintains its own ground handling equipment and technical manpower.

1.17.2. GHA ground support equipment workshop is responsible for the comprehensive maintenance of an extensive range of equipment used in the day-to-day operations ranging from Pushback Tractors, Ground Power Units, Air-conditioning Units, Buses and Pick-ups. This work is carried out in a modern facility with all the required subsidiary shops such as electrical, paintwork, engine re-building, machinery and hydraulics.

1.17.3. **Equipment Inspection –** The procedure for equipment inspection is contained in Gerry's Dnata's Exposition Manual. Below are the salient points: -

1.17.3.1. The entire equipment gets their inspections done according to schedule with the intension of keeping them in serviceable condition.

1.17.3.2. The schedule is designed in such a way that every equipment is inspected. Qualified and skilled Mechanics, Electricians and Engineers check for the entire structure, and if discover any fault is rectified immediately.

1.17.3.3. These inspections are being carried out on monthly, quarterly, half yearly and yearly basis according to the checklists provided by the manufacturer in the equipment's manual.

1.17.3.4. In addition to these scheduled inspections, to make sure the adequate serviceability of the equipment, the operating hours record is being maintained and inspection has been conducted according to the maintenance manual of respective equipment considering the operating hours.

1.17.3.5. As a preventive measure, daily inspection is carried out for all the Equipment. Driver prior to operation carries out daily inspection.

1.17.4. Ambulift involved in this serious incident was owned by GHA and the operator of ambulift was its employee. GHA was primarily responsible for the serviceability of the ambulift, training and authorization of the involved operator.

1.18. Additional Information

1.18.1. Not Applicable.

1.19. Useful & Effective Investigation Techniques

1.19.1. Standard investigation procedures and techniques were used during the course of investigation.

SECTION 2 – ANALYSIS

2.1. General

2.1.1. ICAO Annex-9, requires that Contracting States should ensure that lifting systems or any other appropriate devices are made available in order to facilitate the movement of persons with disabilities between the aircraft and the terminal on both arrival and departure as required where telescopic passageways are not used.

2.1.2. At BBIAP, Islamabad the services were provided for the passengers with disabilities for Emirates flight EK 615 by Gerry's Dnata on 27th February, 2018.

2.2. Ambulift Vehicle

2.2.1. **Introduction –** An ambulift is a specialized vehicle which is used to transport passengers with disabilities or limited mobility from the terminal to the aircraft and vice versa. The passengers are picked up from the terminal in a wheelchair or other mobility aid and are shifted to ambulift, which has a built-in lift to make the transfer easier. The ambulift then drives the passengers to the aircraft, where the passengers are boarded on the aircraft.

2.2.2. **Main Parts of Ambulift** – Manual of ambulift Model CT-5080JCR outlines the following main parts: -

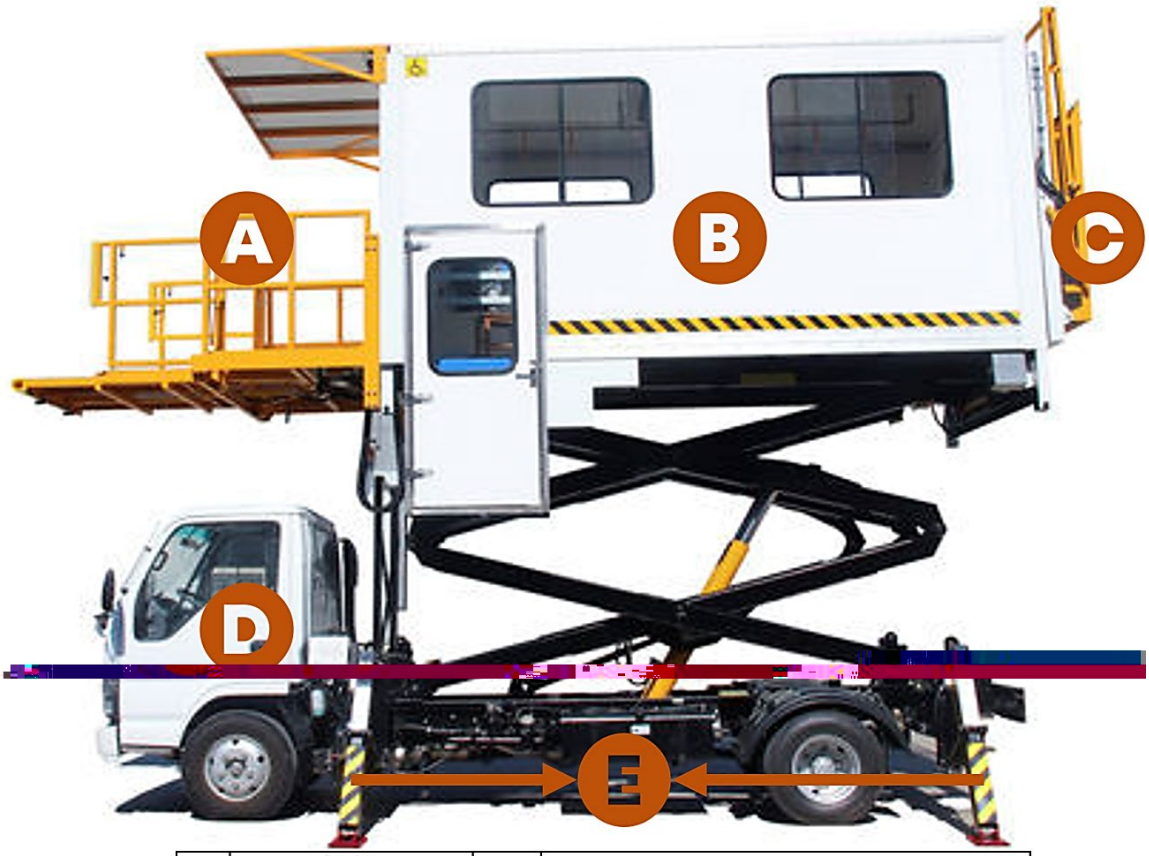
2.2.2.1. **Platform (Front) –** The front platform assembly is composed of a fixed platform, left and right movable platforms, front and rear extension platforms and guard fences.

2.2.2.2. **Van box –** The van box consists of front and rear door frames, a cover, a floor, left and right-side plates. The former fixed rain shed. The floor of the van box is covered by aluminum plates with anti-slip materials applied on the top layer. The passengers are carried in the van box.

2.2.2.3. **Platform (Back) –** After van body back end is equipped with platform.

2.2.2.4. **Earth Station –** Driving Cabin is equipped with Earth Station Control Panel.

2.2.2.5. **Arm-braces –** The arm-braces are directly braced with hydraulic cylinders used for bracing and retrieval. arm-braces act as ground stabilizers for proper balance and safety of ambulift while in use on aircraft.



Ⓐ	Platform (Front)	Ⓓ	Earth Station
Ⓑ	Van box	Ⓔ	Arm-Braces
Ⓒ	Platform (Back)		

Figure 6 Main Parts of Ambulift

2.2.3. **Events Leading to Ambulift toppling –** On site evidence and interview of the operator revealed: -

2.2.3.1. The operator drove the ambulift to the apron along with 04 passengers and 01 loader.

2.2.3.2. Marshaller was not available, so the operator installed the ambulift with aircraft without any assistance / marshaller.

2.2.3.3. The operator lifted the van box of ambulift to the height of aircraft door without extending arm-braces, so ambulift was parked on wheels only.

2.2.3.4. After few minutes the cabin crew opened the aircraft door, meanwhile ambulift became unbalanced and started falling on left side, eventually it collided with air inlet cowl of Engine No. 2 and fell on ground.

2.2.3.5. The operator managed to enter the aircraft before ambulift had toppled.

2.2.4. **Technical Evaluation of Ambulift after the Serious Incident –** The ambulift was evaluated to ascertain its fitness for operation. Following observations were made during the evaluation: -

2.2.4.1. The Driving Cabin, Headlights, Indicators and Brakes were found serviceable.

2.2.4.2. Hydraulic leakage from the jacks of Arm-braces were not observed. However, Hydraulic leakage was observed from rubber pipe providing hydraulic to the rear platform due to two (02) cuts.

2.2.4.3. Van box operation was checked and it was noticed that cabin could be lifted without extending the arm-braces. It was found that the design safeties provided to restrict operation of the van box without extension of arm-braces were not functional. Large number of relay switches were re-wired which bypassed the designed safeties in the system.

2.2.5. Interview with ambulift operator revealed that designed safeties to restrict lifting of van box without extension of arm-braces were not functional during ambulift operation for last one (01) year.

2.2.6. **Induction and Authorization of Ambulift** – Ambulift GD-52 was inducted by GHA at BBIAP Islamabad in January, 2016. GHA is required to get approval of the equipment (ambulift) from PCAA for its operation at an airport. Ambulift GD-52 was not included in Certificate of Authorized List of Vehicles / Equipment (Islamabad Station) in the PCAA Form No. PCAA-027-AWAA-3.0. Ground Handling operator Certificate (GHOC):003 dated 7th February, 2018.

2.2.7. **Equipment Inspection by GHA**

2.2.7.1. Ambulift has been inspected by GHA as per Log Book record according to the checklists contained in Exposition Manual. General Checks contained in the Checklist include:

"Equipment drive forward / reverse / up and down for operation".

2.2.7.2. The operation of van box, Arm-braces and related system designed safeties could have been checked during above check. This check has been performed during the scheduled inspections by the ambulift operator and Personnel of Ground Support Equipment Workshop.

2.2.7.3. Unserviceability of system designed safeties and re-wiring of relay switches remained undocumented and unrectified during inspections by GHA.

2.3. Ambulift Operator

2.2.1. The operator of the ambulift was having Apron Driving Permit to operate a tractor only which expired in December, 2017. He was not authorized to operate ambulift.

2.3.1. The operator was not formerly trained / qualified to operate ambulift.

2.4. Oversight by PCAA

2.4.1. PCAA AIRWORTHINESS NOTICE (AWNOT-024-AWXX-2.0) - Ground Power Units and Ramp Handling Equipment Para D2.3 states:

"Airworthiness field offices may carry out periodic checks to ensure that only suitable, qualified and appropriately trained / licensed manpower is deployed to operate such equipment on the apron."

2.4.2. Standard Operating Procedure (SOP-004-RNAS-2.0) – Apron Management Personnel, Vehicle Operation on the Movement Area at BBIAP Islamabad Para D3.6 states:

"*Manager Airside shall ensure that no official / vehicle operate on the apron without ADP / AVP. Airside Inspectors shall frequently inspect and observe the vehicular traffic to ensure adherence/ compliance of the procedures."*

2.4.3. Ambulift was not included in Certificate of Authorized List of Vehicles / Equipment (Islamabad Station) and operator did not have ADP and requisite training for operation of ambulift.

2.4.4. PCAA oversight was not effective to ensure compliance to the Standard Operating Procedures and Airworthiness Notice by the GHA.

2.5. Flight Operations

2.5.1. Not Applicable.

2.6. Aircraft

2.6.1. Not Applicable.

2.7. Human Factors

2.7.1. Not Applicable.

INTENTIONALLY LEFT BLANK

SECTION 3 – CONCLUSIONS

3.1. **Findings**

3.1.1. The operator drove the ambulift to the apron along with 04 passengers and 01 loader.

3.1.2. Marshaller was not available, so the operator installed the ambulift with aircraft without any assistance / marshaller.

3.1.3. The operator lifted the van box of ambulift to the height of aircraft door without extending arm-braces, so ambulift was parked on wheels only.

3.1.4. After few minutes the cabin crew opened the aircraft door, meanwhile ambulift became unbalanced and started falling on left side, eventually it collided with air inlet cowl of Engine No. 2 and fell on ground.

3.1.5. The operator managed to enter the aircraft before ambulift had toppled.

3.1.6. The aircraft sustained minor damage due to ambulift collision with the air inlet cowl of Engine No. 2.

3.1.7. 04 (four) passengers and 01 (one) ground handling staff sustained injuries and they were shifted to the nearest hospital immediately.

3.1.8. The ambulift sustained damage due to toppling and falling on the ground.

3.1.9. Ambulift involved in this serious incident was owned by GHA and the operator of ambulift was its employee. GHA was primarily responsible for the serviceability of the ambulift, training and authorization of the involved operator.

3.1.10. The operator of the ambulift was having Apron Driving Permit to operate a tractor only which expired in December, 2017. He was not authorized to operate ambulift.

3.1.11. The operator was not formally trained / qualified to operate ambulift.

3.1.12. The medical examination report of the ambulift operator after this serious incident indicated positive results for Marijuana / Cannabis and Alcohol.

3.1.13. Ambulift was not an authorized vehicle to operate at BBIAP as it was not included in the PCAA Certificate of Authorized List of Vehicles / Equipment (Islamabad Station).

3.1.14. PCAA oversight was not effective to ensure compliance to relevant BBIAP SOP and Airworthiness Notice by the GHA.

3.1.15. The design safeties provided to restrict operation of the van box without extension of arm-braces were not functional. Large number of relay switches were re-wired which bypassed the designed safeties in the system.

3.1.16. Unserviceability of system designed safeties and re-wiring of relay switches remained undocumented and unrectified during inspections by GHA.

3.1.17. Interview with ambulift operator revealed that designed safeties to restrict lifting of van box without extension of arm-braces were not functional during ambulift operation for last one (01) year.

3.2. Causes / Contributing Factors

3.2.1. Cause

3.2.2. The operator lifted the van box of ambulift to the height of aircraft door without extending arm-braces, which caused ambulift to become unbalanced and toppled.

Note: Aviation Occurrence Category (ADREP Taxonomy)-Ground Handling (RAMP)

3.2.3. Contributing Factors

3.2.3.1. The design safeties provided to restrict operation of the van box without extension of arm-braces were not functional.

3.2.3.2. Unserviceability of system designed safeties and re-wiring of relay switches remained undocumented and unrectified during inspections by GHA.

3.2.3.3. Marshaller was not available and operator installed the ambulift with aircraft without any assistance / marshaller.

3.2.3.4. The operator was not authorized and qualified to operate ambulift.

3.2.3.5. PCAA oversight was not effective to ensure compliance to relevant Standard Operating Procedures and Airworthiness Notice by the GHA.

INTENTIONALLY LEFT BLANK

SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. GHA may take appropriate measures to ensure the design safeties of Ramp Handling Equipment are operational.

4.1.2. GHA may take appropriate measures to ensure compliance of inspections of Ramp Handling Equipment as per the Checklist.

4.1.3. GHA may take appropriate measures to ensure availability of Marshaller for Ramp Handling Equipment (as applicable).

4.1.4. GHA may take appropriate measures to ensure deployment of authorized operator and Ramp Handling Equipment.

4.1.5. PCAA may take appropriate measures for effective oversight of GHA.