

FINAL INVESTIGATION REPORT



SERIOUS INCIDENT (TYRE BURST & AUTO PILOT NOT DISENGAGING)

**VISION AIR FLIGHT VIS-1105, BOEING 737-3B3(QC) AIRCRAFT,
REGISTRATION NO. AP-BMU AT ALLAMA IQBAL INTERNATIONAL
AIRPORT LAHORE ON 11TH APRIL, 2018**

SCOPE

At Bureau of Aircraft Safety Investigation Pakistan (BASIP) investigations are conducted in accordance with Pakistan Aircraft Safety Investigation (PASI) Act 2023, Air Safety Rules 2025 and International Civil Aviation Organization (ICAO) Annex-13.

The sole objective of the investigation and its final report as per above stated regulations is to prevent future accidents / serious incidents / incidents of similar nature without apportion blame or liability. Accordingly, it is inappropriate to use BASIP investigation reports to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for Judiciary and administrative purpose.

This report contains facts, which are based on information which came to the knowledge of BASIP during the investigation 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.

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ABBREVIATIONS

| | |
|------------------------|--|
| AGL | Above Ground Level |
| AllAP | Allama Iqbal International Airport |
| AMM | Aircraft Maintenance Manual |
| AP | Auto Pilot |
| BASIP | Bureau of Aircraft Safety Investigation Pakistan |
| BITE | Buit-in Testing Equipment |
| CMD | Command |
| CWS | Control Wheel Switch |
| DFDR | Digital Flight Data Recorder |
| ETA | Estimated Time of Arrival |
| FO | First Officer |
| FOD | Foreign Object Debris |
| ft | Feet |
| h | Hour(s) |
| ICAO | International Civil Aviation Organization |
| JIAP | Jinnah International Airport |
| kt | Knots |
| MCP | Mode Control Panel |
| MOR | Mandatory Occurrence Report |
| PF | Pilot Flying |
| PM | Pilot Monitoring |
| QAR | Quick Access Recorder |
| R/W | Runway |
| TOGA | Take-off / Go-Around |
| UTC | Universal Time Coordinated |
| V_{REF} | Landing Approach Speed |

INTRODUCTION

This incident was reported to Bureau of Aircraft Safety Investigation Pakistan (BASIP) then Safety Investigation Board through Mandatory Occurrence Report¹ (MOR). Initial notification of the incident was sent to National Transport Safety Board² on 20th April, 2018 classifying it as a “Serious Incident” in line with Annex-13. The investigation has been conducted by BASIP. All corresponding timings are mentioned in Universal Time Coordinated (UTC).

¹ Vision Air – Mandatory Occurrence Report

² BASIP – ICAO Notification

SYNOPSIS

Vision Air Flight VIS-1105 was a scheduled cargo flight of Boeing 737-3B3 (QC) aircraft from Jinnah International Airport (JIAP), Karachi to Allama Iqbal International Airport (AllAP), Lahore. During landing, the Auto Pilot (AP) did not disengage despite attempts by both, Captain as well as First Officer (FO) due which the aircraft landed with AP engaged. After landing, maximum manual braking was applied to stop the aircraft. During post flight inspection, left inner tyre was found burst.

SECTION 1 - FACTUAL INFORMATION

1.1. History of the flight

1.1.1. Vision Air Flight No. VIS-1105, Boeing 737-3B3 (QC) aircraft Reg. No. AP-BMU was a scheduled cargo flight from JIAP, Karachi to AllAP, Lahore. The aircraft departed from JIAP, Karachi at 1440 hours (h) and landed at AllAP, Lahore at 1610 h. Take-off and enroute flight remained uneventful. For the flight, the First Officer (FO) was Pilot Flying (PF) while the Captain was Pilot Monitoring (PM). The FO initiated descent as per procedure to make an approach for RW 36R. Descent checklist was completed in which Auto Braking was selected to "1". However, during approach, Auto Braking was selected to "OFF Position" by the Captain on the pretext that he wanted to demonstrate the use of manual brakes to the FO. Once the aircraft was stabilized on final approach, the FO disconnected the Auto Throttle at 144 knots (kt) and 555 feet (ft) Above Ground Level (AGL). As the aircraft neared approach minima, the FO attempted to disconnect the

1.1.2. Auto-Pilot (AP) using his control wheel AP disengage switch; however, the AP did not disengage. The FO made another attempt using his control wheel AP disengage switch but the situation did not change. The Captain told the FO to disconnect the AP thinking that he may have forgotten at which point the FO informed the Captain that AP was not disengaging. The Captain took over the controls and attempted to disengage the AP himself using his control wheel AP disengage switch but without success. By this time, the aircraft had descended to 100-150 ft. The Captain then asked the FO to disconnect the AP manually from the Aft Electronic Panel through the Stabilizer Trim Override Switch; however, the FO was unable to do so. The Captain, meanwhile, continued with the landing and made no attempt to

1.1.3. Go-Around from the approach despite having the AP engaged. Flare out was initiated at a height of 40-50 ft AGL and the aircraft touched down on the centreline approximately 2,000-3,000 ft down the R/W. As the aircraft touched down, it started to drift towards the left side. After landing, the Captain retarded the throttles to idle and subsequently applied maximum Thrust Reversal as well as maximum manual braking while bringing the aircraft back to centreline. About the time the Thrust Reversers were stowed. The Captain disconnected the AP by moving the Mode Control Panel (MCP) AP engage paddle to OFF. After the aircraft was brought under control, it was taxied for parking. Subsequently, during post flight inspection, the left inner tyre was found burst.

1.2. Injuries to person(s)

1.2.1. There were no injuries reported to the crew during the occurrence.

1.3. Damage to aircraft

1.3.1. Left inner tyre was found burst.

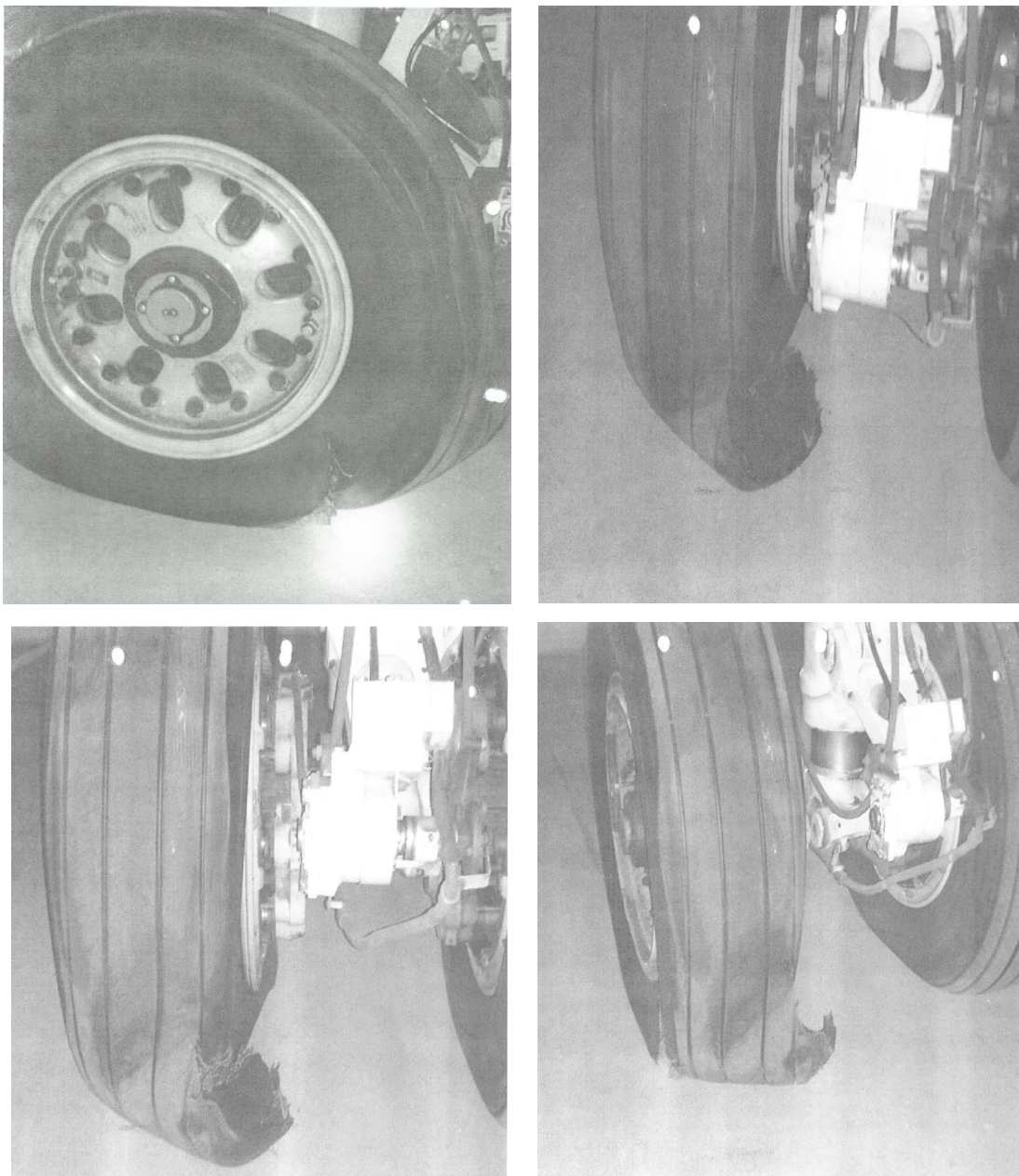


Figure 1 Left Tyre Burst

1.4. Other damages

1.4.1. Not Applicable.

1.5. Personnel information

| | Captain | First Officer |
|---------------|----------------|----------------------|
| Role | Pilot Flying | Pilot Monitoring |
| Captain | 542 h | 388 h |
| First Officer | 12541 h | 813 h |

Table 1 Personnel Information

1.6. Aircraft information

| Aircraft Details | |
|------------------------|--------------|
| Aircraft make | Boeing |
| Aircraft model | 737-3B3 (QC) |
| Registration marking | AP-BMU |
| Manufacturer Serial No | 24388 |
| Year Built | 1989 |

Table 2 Aircraft Details

1.7. Meteorological information

1.7.1. No significant weather was reported at AllAP, Lahore at the time of the serious incident³.

1.8. Aids to navigation

1.8.1. Navigation Aids for AllAP, Lahore are provided below. There was no abnormality reported at the time of the occurrence.

OPLA AD 2.19 RADIO NAVIGATION AND LANDING AIDS

| Type of aid. CAT of ILS (VAR VOR/ILS) | ID | Frequency | Hours of operation | Site of transmitting antenna coordinates | Elevation of DME transmitting antenna | Remarks |
|---|-------------|--------------------|--------------------|--|---------------------------------------|---------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| GP/TDME 36R | Dots/Dashes | 333.8 MHz CH36X | H24 | 313033.37N 0742412.14E | 230M | Coverage 7-10 NM |
| GP/TDME 36L | Dots/Dashes | 333.2 MHz CH34X | H24 | 313043.76N 0742403.96E | - | |
| LLZ 36R | | | | | | Coverage 20 NM |
| ILS CAT III-B (1°E/1995) | ILA | 109.9 MHz | H24 | 313222.57N 0742417.66E | - | |
| LLZ 36L | ILO | 109.7 MHz | H24 | 313223.39N 0742410.55E | - | |
| ILS CAT-I | | | | | | |
| MM 36R | Dashes | 75 MHz | H24 | 312949.99N 0742414.91E | - | - |
| L | LO | 338 KHz | H24 | 312641.15N 0742404.47E | - | - |
| OM 36R | Dashes | 75 MHz | H24 | 312641.50N 0742404.51E | - | - |
| NDB | LA | 268 KHz | H24 | 313123.44N 0742348.25E | - | - |
| DVOR/DME (1°E/1995) | LA | 112.7 MHz CH74X | H24 | 312959.00N 0742400.07E | 222.70M | Coverage 200 NM |

Table 3 Aids to navigation Islamabad

1.9. Communications

1.9.1. Communication frequencies for AllAP, Lahore are attached below. There was no abnormality reported at the time of the occurrence.

³ MET – AllAP, Lahore Data

OPLA AD 2.18 ATS COMMUNICATION FACILITIES

| Service designation | Call sign | Frequency | Hours of operation | Remarks |
|---------------------|---------------|-------------|--------------------|---------------|
| 1 | 2 | 3 | 4 | 5 |
| TWR | Lahore Tower | 118.1 MHz | H24 | Primary |
| TWR | Lahore Tower | 118.875 MHz | H24 | Secondary |
| Apron | Lahore Ground | 118.4 MHz | H24 | Primary |
| Apron | Lahore Ground | 121.8 MHz | H24 | Secondary |
| ATIS | ATIS | 126.3 MHz | H24 | |
| | Lahore APP | 121.3 MHz | H24 | Primary |
| APP | Lahore APP | 125.3 MHz | H24 | Secondary |
| | Lahore APP | 121.5 MHz | H24 | Emergency |
| BS | Radio | 630 KHz | HX | 0130-1900 HR |
| BS | Pakistan | 1090 KHz | HX | Variable SKED |

Table 4 ATS Communication Facilities

1.10. Aerodrome information

1.10.1. Aerodrome information for AllAP, Lahore is given below. There was no abnormality reported at the time of the occurrence.

OPLA AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

| | |
|---|--|
| 1. ARP coordinates and site at AD | 313117.62N 0742416.47E Centre of RWY 18L/ 36R |
| 2. Direction and distance from (city) | 7 NM South East of Lahore |
| 3. Elevation/Reference temperature | 712 feet / 41.2° C |
| 4. MAG VAR/Annual change | 01.0 E |
| 5. AD Administration, address, telephone, telefax, telex, AFS | CIVIL AVIATION AUTHORITY Airport Manager, Allama Iqbal International Airport, Lahore. apmailap@caapakistan.com.pk Tel: (92 42) 99240508 Fax: (92 42) 36611507 AFS: OPLAYDYX Telegram: CIVILDROME LAHORE |
| 6. Types of traffic permitted (IFR/VFR) | IFR/VFR |
| 7. Remarks | - |

Table 5 Aerodrome Geographical and Administrative Data

1.11. Flight recorders

1.11.1. Quick Access Recorder (QAR) was analyzed to ascertain the parameters on landing and to check for any abnormalities. The data showed that Auto Pilot-B was engaged until after the Pilot had landed. No other abnormality was found after analysis.

1.12. Wreckage and impact information

1.12.1. Not Applicable.

1.13. Medical and pathological information

1.13.1. Post occurrence blood and urine samples were not taken. However, aircrew had valid medical fitness for flying duties.

1.14. Fire

1.14.1. Not Applicable.

1.15. Survival aspects

1.15.1. Not Applicable.

1.16. **Test & research**

1.16.1. Not Applicable.

1.17. **Organizational and management information**

1.17.1. Not Applicable.

1.18. **Additional information**

1.18.1. Not Applicable.

1.19. **Useful or effective investigation techniques**

1.19.1. Standard investigation procedures and techniques were used by BASIP to investigate and ascertain the cause of the serious incident.

SECTION 2 – ANALYSIS

2.1 General

2.1.1 Vision Air Flight No. VIS-1105 Boeing 737-3B3 (QC) aircraft Reg. No. AP-BMU was a scheduled cargo flight from JIAP, Karachi to AllAP, Lahore. Ground operations at JIAP, Karachi were all normal. The aircraft took off at 1440 h with Estimated Time of Arrival (ETA) at AllAP, Lahore as 1610 h. Flight enroute to Lahore was uneventful with no event of significance. For the flight, the Captain was PM whereas the FO was PF.

2.2 Aircraft Loading

2.2.1 The aircraft loading was carried out within the prescribed limits.

2.3 Crew Qualification

2.3.1 Both the Captain and FO held a valid license and medical category as to undertake the flight.

2.4 Descent and Approach

2.4.1 The Flight Crew initiated descent as per procedure to make an approach for R/W 36R. Descent checklist was completed in which Auto Braking was selected to "1". However, during approach, Auto Braking was selected off by the Captain on the pretext that he wanted to demonstrate to the FO the aircraft behaviour after landing without the use of Auto Brakes.

2.5 Final Approach

2.5.1 Once the aircraft was stabilized on final approach, the PF disconnected the Auto Throttle at 144 kt (VREF + 05 kt) and 555 ft AGL. As the aircraft neared approach minima, the FO attempted to disconnect the AP using his control wheel AP disengage switch; however, the AP remained engaged. The FO made another attempt to disconnect the AP using his control wheel AP disengage switch but the situation did not change. The Captain told the FO to disconnect the AP thinking that he may have forgotten. The FO informed the Captain that AP was not disengaging despite his attempts. The Captain took over the controls and attempted to disengage the AP himself using his control wheel AP disengage switch but without success. Aircraft height by this time was 100-150 ft AGL. The Captain then indicated to the FO to disconnect the AP manually from the Aft Electronic Panel through the Stabilizer Trim Override Switch; however, the FO was unable to do so. The Captain, meanwhile, continued with **the landing and made no attempt to Go-Around from the approach despite having the AP engaged because, in his opinion, the AP might have put the aircraft in some unusual attitude if the aircraft had gone around. On the contrary, engaging Take-off & Go-Around (TOGA)⁴ would have disconnected the AP.**

⁴ Vision Air – Internal Investigation Report – Appendix 'D'

2.5.2 By design, any of the following flight crew actions will disengage the Boeing 737-300 Autopilot: -

2.5.2.1 Pushing either pilot's control wheel AP disengage switch.

2.5.2.2 Pushing TOGA with a single AP engaged in Control Wheel Steering (CWS) or Command (CMD) below 2000 ft RA.

2.5.2.3 Pushing either TOGA switch after touchdown with both APs engaged in CMD.

2.5.2.4 Moving the MCP AP engage paddle to OFF.

2.5.2.5 Activate either pilot's control wheel trim switch.

2.5.2.6 Move the STAB TRIM AUTOPILOT cutout switch to CUTOUT.

2.5.3 Moreover, the AP during landing was engaged in single channel (Channel B). As per aircraft design, sufficient control wheel input would not disengage the AP either as design limitations dictate that only dual channel AP engagement can be overridden with control inputs. As a result, the AP remained engaged in Command mode despite pilot inputs.

2.6 Flare Out & Touchdown

2.6.1 Flare out was initiated 40-50 ft above the R/W by the Captain and assisted by the FO. The aircraft touched down on the centerline approximately 2,000-3,000 ft down the R/W. As the aircraft touched down, it started to drift towards the left side. After landing, the Captain retarded the throttles to IDLE and subsequently applied maximum thrust reversal as well as maximum manual braking while bringing the aircraft back to centerline, even though maximum braking was not required as the aircraft had touched down within landing zone at a comfortable speed {140 kt}. However, as the aircraft had started to drift left on touchdown it is possible that the tyre had burst on landing due to some Foreign Object Debris (FOD) present on the Runway.

2.7 Landing Roll

2.7.1 Once the aircraft slowed down on the Runway, the Captain disconnected the AP by moving the MCP AP Engage Paddle to OFF.

2.8 Parking & Shut Down

2.8.1 After vacating the R/W, the aircraft proceeded towards the assigned parking bay where aircraft was parked and subsequently shut down.

2.9 Post Shut Down

2.9.1 After shutting down the aircraft, the Captain asked the Flight Engineer to inspect the tyres for any anomaly. Meanwhile the tower informed that one of the tyres had burst and that some tyre pieces had been found on the R/W. Inspection revealed that the left inner tyre had ruptured.

2.10 Post Flight Investigation

2.10.1 **Auto Pilot:** A Digital Flight Guidance Computer Operational Built-in Test Equipment (BITE) check was performed as per the Aircraft Maintenance Manual (AMM); no anomalies were noted. No AP components were removed for evaluation and no wiring checks were performed. Potentially the AP disengagement failure was a one-time anomaly which could not be duplicated on ground subsequently.

2.10.2 **Anti-skid system:** An Anti-skid System Diagnostic Test was performed as per the AMM and there was no defect found in the anti-skid system which might have caused the tyre to jam and rupture after skidding on the R/W. No anti-skid system components were removed for evaluation and no wiring checks were performed. Also, all the other tyres were in good condition without any evidence of wearing out or skidding. Moreover, the tyre was ruptured from one side rather than the center indicating that the tyre burst was likely not due to the anti-skid malfunction.

2.10.3 **Braking system:** There was no abnormality or any sign of overheating on any of the brakes. Moreover, all the fusible plugs on the wheels were found intact which also indicates that excessive brakes had not been used⁵.

2.10.4 **Tyre condition:** The affected tyre was a new tyre which also precludes the possibility that the tyre burst occurred because of worn out condition or excessive use.

⁵ Vision Air – “Q.A. Report”

SECTION 3 – CONCLUSIONS

3.1. Findings

- 3.1.1. Vision Air Flight No. VIS-1105 was a scheduled cargo flight from JIAP, Karachi to AllAP, Lahore.
- 3.1.2. Ground operations, take-off and enroute flight were all normal with no significant event.
- 3.1.3. The FO was PF while the Captain was PM.
- 3.1.4. The aircraft was cleared for descent for approach R/W 36R.
- 3.1.5. Descent checklist was completed and auto braking was selected to "1".
- 3.1.6. During approach for R/W, the Captain selected the Auto Braking "OFF" in order to demonstrate aircraft behaviour after landing without using auto brakes.
- 3.1.7. Once aircraft was stabilized on final approach, the FO disconnected auto throttle at 555 ft AGL at a speed of 144 kt (VREF + 05 kt).
- 3.1.8. On approaching minima, the FO attempted to disconnect the AP using his control wheel AP disengage switch; however, it remained engaged.
- 3.1.9. The FO made another attempt to disengage the AP using his control wheel AP disengage switch but the situation remained unchanged.
- 3.1.10. The Captain reminded the FO to disconnect AP at which time FO informed the Captain that AP was not disengaging.
- 3.1.11. The Captain took over the controls at 100-150 ft and attempted to disengage the AP himself using his control wheel AP disengage switch but with no success.
- 3.1.12. The Captain asked the FO to disconnect the AP manually from the Aft Electronic Panel through the Stabilizer Trim Override Switch but the FO was unable to do so.
- 3.1.13. The Captain continued with the landing and made no attempt to Go-Around from the approach because, in his opinion, the AP might have put the aircraft in some unusual attitude after going around even though the AP would have disengaged on selecting throttles to TOGA.
- 3.1.14. Aircraft flared out 40-50 ft above the R/W with the Captain on controls and assisted by the FO.
- 3.1.15. The aircraft touched down 2,000-3,000 ft down the R/W at 140 kt.
- 3.1.16. After touchdown, the aircraft started to drift towards the left side of the R/W.
- 3.1.17. After landing, the Captain put the throttles to IDLE and then applied maximum thrust reversal with maximum manual brakes while bringing the aircraft back to the centerline.
- 3.1.18. As the aircraft was brought under control on the R/W, the Captain disconnected the AP by moving the MCP AP engage Paddle to OFF.
- 3.1.19. After parking and shut down, the ATC Tower informed on radio that one of the tyres had burst.

- 3.1.20. Inspection by the Flight Engineer also confirmed that the left inner tyre had ruptured.
- 3.1.21. Technical investigation revealed no anomaly with the AP system.
- 3.1.22. There was no anomaly detected in the anti-skid system.
- 3.1.23. There was no indication of any fault or overheating in the brakes of the aircraft.
- 3.1.24. The affected tyre was also new and in good condition.
- 3.1.25. There was no anomaly observed on any of the other tyres.
- 3.1.26. The rupture of the tyre may have been caused by the presence of FOD on the R/W once the aircraft landed.
- 3.1.27. The failure of the AP to disengage may have been a one-time failure which subsequently could not be duplicated.

3.2. **Cause**

- 3.2.1. The exact cause of occurrence could not be determined, however, the rupture of the tyre may have been caused by the presence of FOD on the RW once the aircraft landed.

3.3. **Contributory Factors**

- 3.3.1 Nil

*Note: Aviation Occurrence Category (ADREP Taxonomy) –
System/component failure or malfunction (non-powerplant) (SCF-NP)
Failure or malfunction of an aircraft system or component other than the powerplant.
Malfunctioning of Rotorcraft main rotor and tail rotor system, drive system and flight control failures*

*Note: Aviation Occurrence Category (ADREP Taxonomy) –
Unknown or undetermined (UNK)
Insufficient information exists to categorize the occurrence.
No enough information at hand to classify the occurrence.*

SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. Use of auto braking may be made mandatory, and any deviation from normal for training purposes or otherwise must be decided prior to the flight.

4.1.2. Crew knowledge may be refreshed regarding emergency procedures and emergency handling at critical stages of flight.