
# GOVERNMENT OF INDIA

**CIVIL AVIATION DEPARTMENT**

# FINAL INVESTIGATION REPORT ON

# INCIDENT OF GEAR-UP TOUCH DOWN TO M/s PAWAN HANS LTD DAUPHIN SA 365 N3 HELICOPTER REGN. VT-PHO AT GUWAHATI ON 24.07.2019.

**O/o Dy. Director General of Civil Aviation (ER)**

**Air Safety Directorate, NSCBI Airport,**

**Kolkata – 700052**

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## FOREWORD

This document has been prepared based upon the evidences collected during the investigation and opinion obtained from the experts. The investigation has been carried out in accordance with Annex 13 to the convention on International Civil Aviation and under Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents), Rules 2017.

The investigation is conducted not to apportion blame or to assess individual or collective responsibility. The sole objective is to draw lessons from this incident which may help to prevent such future incidents.

## LIST OFABBREVIATIONS USED IN THE REPORT

| | |
|---|---|
| AME | Aircraft Maintenance Engineer |
| AOP | Air Operator Permit |
| ATC | Air Traffic Control |
| ATPL(H) | Airline Transport Pilot Licence Helicopter |
| BR | Bright |
| CB | Cumulonimbus |
| CPL (H) | Commercial Pilot Licence (Helicopter) |
| CVR | Cockpit Voice Recorder |
| DFDR | Digital flight data recorder |
| DGCA | Directorate General of Civil Aviation |
| DME | Distance Measuring Equipment |
| DP | Dew Point |
| DVOR | Doppler Very High Frequency Omni Range |
| FDTL | Flight and Duty Time Limitation |
| FT | Feet (unit of length) |
| hPa | Hacto pascal (unit of atmospheric pressure) |
| ILS | Instrument Landing System |
| INS | Inches |
| IR | Instrument Rating |
| IST | Indian Standard Time |
| Kg | Kilogram |
| KM | Kilo meter |
| LH | Left hand |
| MHz | Mega hertz |
| PDR | Pilot's |
| Defect Report | |
| PF | Pilot Flying |
| PIC | Pilot In-Command |
| PNF | Pilot not flying |
| REQ | Require |
| RH | Right Hand |
| RWY | Runway |
| SOP | Standard Operating Procedure |
| STD BY | Stand By |
| SW/S | South West / South |
| UTC | Coordinated Universal Time |
| VHF | Very High Frequency |
| VT-PHO | Registration of the helicopter |

# FINAL INVESTIGATION REPORT ON

# INCIDENT OF GEAR-UP TOUCH DOWN TO M/s PAWAN HANS LTD DAUPHIN SA 365 N3 HELICOPTER VT-PHO

# AT GUWAHATI ON 24.07.2019.

| | | | |
|---|---|---|---|
| 1. | Helicopter | Type | DAUPHIN SA 365 N3 |
| | | Nationality | Indian |
| | | Registration | VT-PHO |
| 2. | Owner | | Pawan Hans Ltd., Safdarjung Airport, New Delhi. |
| 3. | Operator | | Pawan Hans Ltd., Safdarjung Airport, New Delhi. |
| 4. | Pilot – in –Command | | CHPL Holder |
| | | Extent of injuries | Nil |
| 5. | Co Pilot | | ATPL (H) Holder |
| | | Extent of injuries | Nil |
| 6. | No. of Cabin Crew on board | | Nil |
| | Extent of Injuries | | Nil |
| 7. | No. of Passengers on board | | Nil |
| | Extent of Injuries | | Nil |
| 8. | Last point of Departure | | Guwahati |
| 9. | Intended landing place | | Guwahati |
| 10. | Place of Incident<br>Geographical Coordinates: | | Guwahati Airport<br>260618 N ; 0913508 E |
| 11. | Date & Time of Incident | | 24.07.2019; 17.20 IST Approximately |
| 12. | Type of Operation | | Non-Scheduled (Training) |
| 13. | Phase of Operation | | Landing |
| 14. | Type of Occurrence | | ARC: Abnormal Runway Contact |

(All timings in the report are in IST unless or otherwise specified).

## Synopsis:-

Dauphin SA365 N3 helicopter, registration VT-PHO owned and operated by M/s Pawan Hans Ltd. was scheduled to operate a training sortie on 24.07.2019 at Guwahati for recency check of a pilot. The helicopter took off at 1645 IST from RWY 02 of Guwahati airport with only 02 flight crew. There was no passenger or cabin crew on board the helicopter. The Pilot-in Command was under

recency check and Co-pilot was examiner. The departure as well as the destination aerodrome was Guwahati. After practicing all maneuvers, helicopter was returning back to Guwahati for practicing circuit and landing. The Pilot-in Command was on the controls. While landing on RWY 02 at 17.20 IST approx, the bottom surface of the helicopter touched the runway. The co-pilot (examiner) realised that landing gear of the helicopter was not down and immediately took over the controls from the pilot-in command and lifted the helicopter and extended the landing gear down. Thereafter, the co-pilot (examiner) landed the helicopter and taxied it back to dispersal near the hanger. There was no injury to the flight crew. There was no fire.

DGCA, India, instituted an investigation under Rule 13(1) of Aircraft (Investigation of Accidents and Incidents), Rules 2017 by appointing an Investigator in-charge. The incident occurred due non-adherence to standard operating procedure by the flight crew. The flight crew did not carryout the pre-landing check-list and did not ensure extension of the landing gear to down position before landing.

# 1. **Factual Information**

## 1.1. History of flight:

**1.1.1.** Dauphin SA 365 N3 helicopter registration VT-PHO owned and operated by M/s Pawan Hans Ltd. was planned to operate a flight on 24.07.2019 at Guwahati. The purpose of the flight was to provide recency training to a pilot. The helicopter was inspected and prepared by the AME on ground. There was 500 kg of fuel on board the helicopter. The flight crew conducted external checks and cockpit checks of the helicopter on ground before departure. There was no snag on the helicopter before departure. After obtaining necessary clearance from ATC Guwahati, the helicopter took off at 1645 IST from RWY 02 of Guwahati airport with 02 flight crew. Pilot-in-Command was the pilot flying (PF). He was under recency checks. He was on right seat. Co-pilot was on the left seat and was pilot-non flying (PNF). The co-pilot was examiner for the recency check of the pilot-in-command. There were no passenger or cabin crew on board the helicopter. The departure as well as the destination aerodrome was Guwahati. The helicopter initially climbed to 1000 feet and further climbed to 3000 feet on clearance from Guwahati RADAR. After practicing all maneuvers, the helicopter set course back to Guwahati for practicing circuit and landing. The pilot-in-command had the controls.

**1.1.2.** When the helicopter was 05 NM approx. inbound Guwahati airfield, it was instructed to change over from RADAR frequency to Tower frequency (118.75 MHz). On contacting ATC Tower, the helicopter was instructed to join left-hand downwind for runway 02. The Pilot-in-Command manoeuvred the helicopter to join downwind for runway 02 as instructed by ATC Tower. The ATC Tower then asked the helicopter to make a call when it was on final approach for runway 02. On final approach, the co-pilot (examiner) informed the pilot- in- command that he would be simulating one engine failure. The pilot-in-command agreed and prepared himself for simulated engine failure. The examiner simulated left engine failure. The pilot-in-command controlled the helicopter and continued approach.

**1.1.3.** As the pilot-in-command made approach for landing, he tried to maintain runway centre line, correct speed and a shallow rate of descent. As he approached the ground for touch down, he heard scratching sound. The co-pilot (examiner) realized that the helicopter had touched on its belly and he immediately took over the controls from the pilot-in- command. He said that the undercarriage was not down. He then made the helicopter to climb using the collective, switched back the left engine from simulated failure to flight mode and put the landing gear switch down. The landing gear was extended. The helicopter landed near taxiway 'G' and further sortie was discontinued. The same was informed to ATC Tower. The helicopter vacated runway and proceeded to dispersal. After reaching the dispersal, the engine were shut down and the helicopter was parked. There was 280 kg of fuel remaining on board the helicopter after the flight. The occurrence was reported to M/s Pawan Hans Ltd. office at Guwahati.

## 1.2. Injury to Persons

| Injuries | Crew | Passengers | Others |
|---|---|---|---|
| Fatal | Nil | Nil | Nil |
| Serious | Nil | Nil | Nil |
| Minor/None | Nil/02 | Nil | |

## 1.3. Damage to the helicopter:

There was minor damage to the helicopter in the following areas:

1.3.1. R.H side vertical fin bottom side had rubbing marks (paint scrapped).

1.3.2. Horizontal stabilizer had cracks at various areas.

1.3.3. Tail skid steel plate bottom surface paint was rubbed and scrapped. There was a crack around installation hole. Crack and delamination observed on fibre glass surface.

1.3.4. HF Antenna: There was crack on the leading edge and RH side and scrap at the bottom surface.

1.3.5. VHF Antenna: 4 mm material scrapped in the bottom surface.

1.3.6. ADF Antenna: 2 mm material scrapped.

## 1.4. Other damages: Nil

## 1.5. Personnel information:

### 1.5.1. Pilot- in-Command:

| | |
|---|---|
| Age | 39 yrs , Male |
| Type of licence | CPL (H) holder |
| Date of Issue | 31/01/2002 |
| Valid upto | 31/01/2022 |
| Category | Helicopter |
| Date of last Class 1 Medical Assessment | 05/04/2019 |
| Medical Exam validity | 04/04/2020 |
| FRTO Licence issued on | 07/02/2003 |
| FRTO Licence valid up to | 06/02/2023 |
| Instrument Rating | 30/12/2015. (Not valid on date of incident). |
| Total Flying Hours Experience | 6783 Hrs 45 Min. |
| Total Flying Hours on type (N3) | 85 Hrs 10 Min. |
| Total Flying Hours Experience on type AS 365 N3 Dauphin helicopter in last 01 year. | 00 Hrs 00 Min. |
| Total flying experience in 01 year | 179 Hrs 40 Min |
| Total flying experience in last 180 days | 122 Hrs 45 Min |
| Total flying experience in last 90 days | 60 Hrs 05 Min |
| Total flying experience in last 30 days | 13 Hrs 45Min |
| Total flying experience in last 7 days | 0 Hrs 45 Min |
| Total flying experience in last 24 hrs. | 00 Hrs 00 Min |
| Rest before duty | 16 Hrs |

The Pilot-in-Command was the pilot flying. He was undergoing 'recency check'. He was planned to undergo Instrument Rating (IR) check on 24.07.2019 after completion of recency check. His IR was not valid on the date of the incident. He had flown 3969 Hrs 40 Min. on Dauphin SA 365 N helicopter. In last one year, he had flown only Ecureuil AS 350 B3 helicopter that had skids as landing gear.

### 1.5.2. Co-Pilot:

| | |
|---|---|
| Age | 54 yrs , Male |
| Type of licence | ATPL (H) holder |
| Date of Issue | 27/01/2015 |
| Valid upto | 26/01/2020 |
| Category | Helicopter |
| Date of last Class 1 Medical Assessment | 21/05/2019 |
| Medical Exam validity | 20/11/2019 |
| FRTO Licence issued on | 15/10/2008 |
| FRTO Licence valid up to | 14/10/2023 |
| Instrument Rating | 14/12/2018 |
| Total Flying Hours Experience | 6484 Hrs 40 Min. |
| Total Flying Hours on type (N3) | 1885 Hrs 10 Min. |
| Total Flying Hours Experience on type AS 365 N3 Dauphin helicopter in last 01 year. | 103 Hrs 50 Min. |
| Total flying experience in 01 year | 239 Hrs 45 Min |
| Total flying experience in last 180 days | 142 Hrs 10 Min |
| Total flying experience in last 90 days | 41 Hrs 40 Min |
| Total flying experience in last 30 days | 15 Hrs 10 Min |
| Total flying experience in last 7 days | 04 Hrs 50 Min |
| Total flying experience in last 24 hrs. | 00 Hrs 45Min |
| Rest before duty | 16 Hrs |

He was examiner for the pilot-in command for carrying out recency checks.

## 1.6 Aircraft information:

### 1.6.1. Aircraft Information:

| **AIRCRAFT:- VT-PHO** | |
|---|---|
| Manufacturer | EUROCOPTER MARIGNANE, France |
| Type | AS 365 N3 DAUPHIN |
| Owner | Pawan Hans Ltd. New Delhi, India |
| Operator | Pawan Hans Ltd., New Delhi, India. |
| Manufacturer Serial no. | 6734 |
| Year of Manufacture | 2006 |
| Certificate of Airworthiness | Issued on 11/04/2007 |
| Airworthiness Review Certificate | Valid till 28/02/2020. |
| Category | Normal Passenger |
| Certificate of Registration | 3379, Issued on 30/05/2006, |
| Minimum Crew Required | 02 |
| Maximum All Up weight | 4300 kg |
| Last Major inspection | 1200 Hrs at 7324:56 Airframe hours on 05/05/2018 |
| Last inspection | 50 Hrs/02 months at 7783:14 Airframe Hrs 05/06/2019. |
| Airframe Hrs since new | 7784 Hrs 20 Min |
| Airframe hours since last ARC | 44 Hrs 18 Min |
| Status of Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications | Till date. |

### 1.6.2: Engine Information:

| **Engine:-** | **LH** | **RH** |
|---|---|---|
| Manufacturer | SAFRAN | SAFRAN |
| Type | ARRIEL 2C | ARRIEL 2C |
| Engine Serial no. | 24460 | 49002 |
| Time Since New | 5039 Hrs 25 Min | 5361 Hrs 47 Min |
| TSO | Not applicable | Not applicable |
| Last Major Inspection Carried out | 600 Hrs at 4580 :01 Engine Hours on 05.05.2018 | 600 Hrs at 4902 :23 Engine Hours on 05.05.2018 |

| | |
|---|---|
| Last inspection Carried out | 50 Hrs Inspection at (L) 5038:01 Engine Hrs and (R) 5360:41 Engine Hrs on 05.06.2019. |
| Next Inspection due | 25 Hrs Inspection |

Certificate of Release to Service was issued on 24.07.2019 (date of incident).

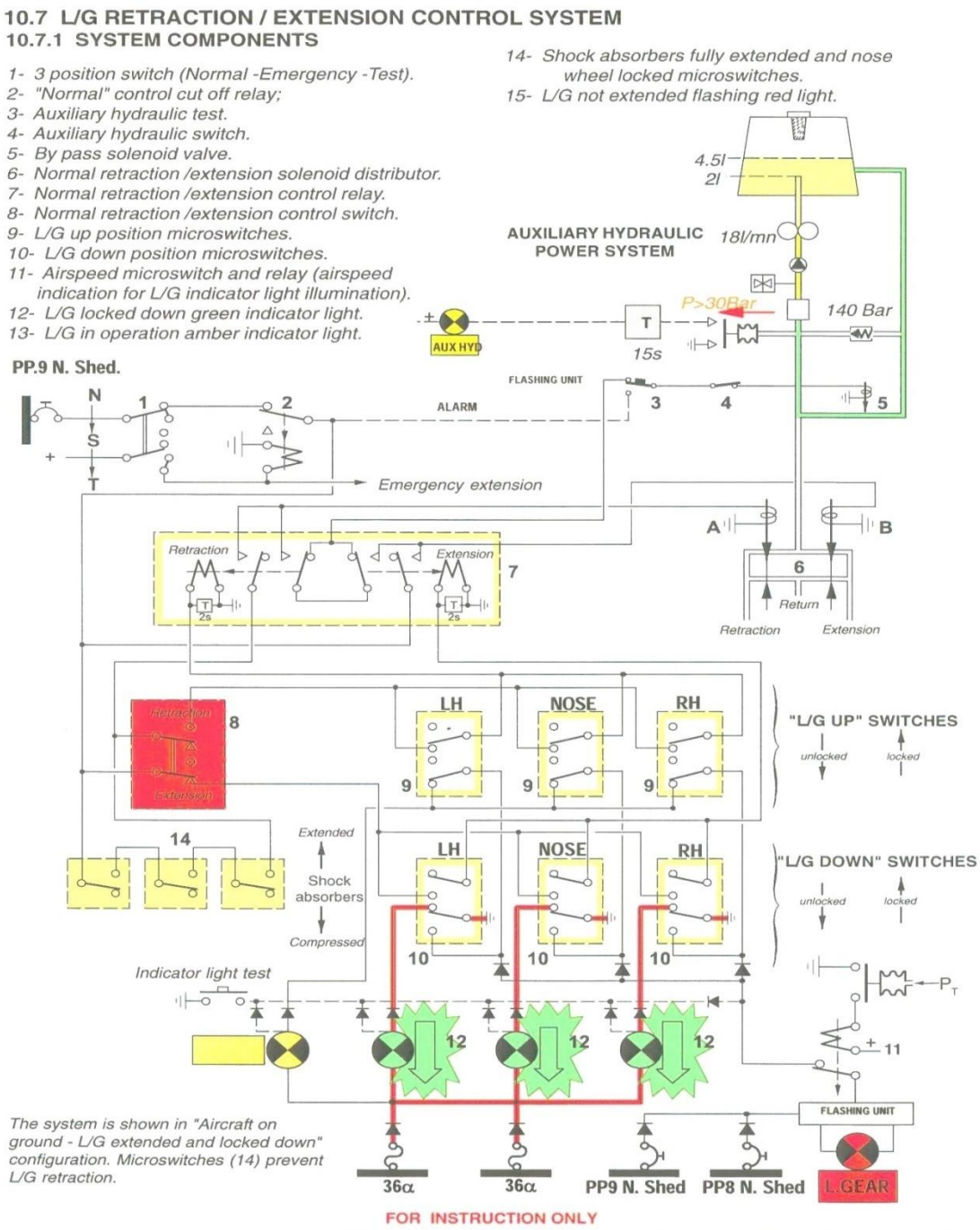
**1.6.3. Pilot Defect Report (PDR):-**

"At the time of landing, under carriage was not down and scrapped the under surface. Post landing, in external checks noticed severe scrap on the tail skid and crack on right side horizontal stabilizer."

**1.6.4. Centre of Gravity:** There were only 02 flight crew on board the helicopter. The helicopter was not over loaded. The centre of gravity was within limits.

**1.6.5. Fuel:** The helicopter used aviation turbine fuel with specification Jet A-1. There was approx 280 kg of fuel on board after landing of the helicopter at Guwahati.

**1.6.6. Description of Landing Gear Retraction / Extension Control System:**






Landing Gear Retraction / Extension Control System Schematic Diagram

### 1.6.6.1. Auxiliary Hydraulic System, Dauphin N/N3 (switches, relays, indicators)

1. 3 position s/w in the cockpit

2. Cut off relay
3. Auxiliary hydraulic test button in the cockpit
4. Auxiliary hydraulic test switch in the cockpit
5. Bypass solenoid valve
6. Normal retraction/extension solenoid distributer
7. Normal retraction/extension control relay
8. Normal retraction/extension control switch
9. L/G up position micro switches
10. L/G down position micro switches
11. Airspeed micro switch and relay
12. L/G locked down green indicator light
13. L/G in operation amber light
14. Shock absorbers fully extended and nose wheel locked micro switches
15. L/G not extended flashing light (air speed below 55 kts)

**1.6.6.2. Control System Description:** When the 3 position switch, in the cockpit, is selected to DOWN position, power is made available to bypass solenoid valve (5) which closes the pressure line (which otherwise was a return line to tank causing NIL pressure in the system called "NO CALL FOR POWER") causing the system to pressurise up to 140 bar. (This state is called "CALL FOR POWER).

The three position switch when selected to DOWN position also energises the extension relay (7) causing Retraction/Extension solenoid valve (6) to energise relay (B) and open extension valve and fluid to pass to the upper chamber of the actuator and to open the UP mechanical lock and closes the UP LOCK micro switches in all three L/G actuators and also push the actuator DOWN. This state of UP LOCK (closed) and DOWN LOCK (closed) provides AMBER indication in the cockpit to state that the L/G is in OPERATION. Max permitted time is 7 (seven) seconds before which the L/G's must be extended and locked. While the actuator moves down under pressure and at the end of the travel the DOWN mechanical LOCK closes and DOWN micro switches opens and disconnect circuit to AMBER light (amber light extinguishes) and provides contact to GREEN lights to illuminate permanently till switch put to retraction or battery switch is selected to OFF, in the cockpit. Simultaneously, the DOWN lock micro switches provides circuit to EXTENSION relay (7) to close and thus to close the EXTENSION VALVE (6) to close and also to OPEN the bypass valve (5) to open to facilitate the system pressure to return to tank making zero pressure "NO CALL

FOR POWER" in the system. By pass valve opens after a time delay of 15 sec by a time delay unit to ensure positive mechanical lock.

Similarly the retraction process also takes place involving same components in opposite direction. However, an important feature is provided in the retraction system and that is the SAFETY MICRO SWICHES provided on the landing gear casing and one NOSE CENTERING MICRO SWITCH.

When the three position micro switch in cockpit selected to UP position, the power will not be reached to retraction relay (7) and to retraction valve (A) in (6) unless the all the three SAFETY MICRO SWITCHES are closed (the shock struts are NOT compressed and aircraft load is NOT supported on landing gears, NOT on ground but extended and either in air or on jacks) and the NOSE CENTERING MICRO SWITCH is opened (nose wheel centred.)

An another provision given is to caution the cockpit that the L/Gs are NOT EXTENDED by means of a RED FLASHING LIGHT (L.GEAR) when the aircraft speed is less than 55 kts. This is achieved by means of a bellow fed with P1 pressure to close contacts and to make circuit to flash the light warning that the aircraft is about to land but the L/Gs are still in retracted position-CAUTION.

**1.7 Meteorological information:**

**1.7.1**. Meteorological Report of 24/07/2019 at 11:30 UTC (17:00 IST) at Guwahati Aerodrome:

WIND 29003 KT VISIBILITY: 5 KM, Weather: BR; Cloud 1: SCT 1800 FT (540 MTS)
Cloud: FEW CB 2500 FT (750 MTS); Cloud3: BKN 10000 FT (3000 MTS)
Temperature: 32$^{o}$ C; QNH: 1000 hPa (29.55 INS); Dew Point : 27$^{o}$ C;
QFE: 0994 hPa (29.38 INS); Trend: NO SIG; Remarks: CB to SW/S

**1.7.2.** Meteorological Report of 24/07/2019 at 12:00 UTC (17:30 IST) at Guwahati Aerodrome:
WIND 34003 KT VISIBILITY: 5 KM, Weather: BR; Cloud 1 : SCT 1800 FT (540 MTS)
Cloud: FEW CB 2500 FT (750 MTS); Cloud3: BKN 10000 FT (3000 MTS)
Temperature: 31$^{o}$ C; QNH : 1001 hPa (29.56 INS); Dew Point : 27$^{o}$ C
QFE : 0995 hPa (29.39 INS); Trend : BECMG 3000- TSRA; Remarks : CB to SW
Weather was fine and it was not a contributory factor to the incident.

### 1.8. Aids to navigation:

Guwahati aerodrome is equipped with navigational aids like DVOR, DME and ILS. All aids to navigation were serviceable. Onboard navigational equipment of the helicopter VT-PHO were also serviceable. No un-serviceability was reported.

### 1.9. Communication:

The helicopter is equipped with VHF communication equipment. Guwahati ATC is also equipped with VHF communication facility. Two way VHF radio communications was available between the ATC and the helicopter throughout its flight. Even after landing the helicopter informed ATC that it was aborting further sorties and taxiing to dispersal near hangar of 'Pawan Hans'

### 1.10 Aerodrome information:

Guwahati Aerodrome has runway ends with names 02 and 20. Information about various distance available are given below:

| Distances | Runway 20 | Runway 02 |
|---|---|---|
| Take-off Run Available | 3103 metres | 3103 metres |
| Take-off Distance Available | 3103 metres | 3103 metres |
| Accelerated Stop Distance Available | 3103 metres | 3103 metres |
| Landing Distance Available | 3103 metres | 3103 metres |

Apron at the aerodrome is divided in two parts. One part is located in front of the terminal building. The other part of the apron is located closer to the runway 20 and linked to it by taxiway 'G'. A hangar for 'Pawan Hans Ltd.' helicopters is also located near this apron. The helicopter VT-PHO landed near taxiway 'G' and taxied to dispersal of 'Pawan Hans Ltd' hangar.

### 1.11. Flight recorders:

#### 1.11.1. CVR:

The communication of both the flight crew was recorded in CVR. The flight crew did not carry out the 'pre-landing' check list before landing. The first item in this checklist is to extend the landing gear to down position. It was not done. Also when the helicopter touched on its belly, one flight crew (examiner) was heard telling the other flight crew that the landing gear was not down.

**1.11.2 DFDR:-**

1.11.2.1. At reference time 00:10:13, the helicopter took-off.

1.11.2.2. At reference time 00:40:10, the warning landing gear 'not extended' appeared in Cockpit at pressure altitude of 592 feet.

1.11.2.3. At reference time 00:41:08, the helicopter touched down on runway without extending landing gear. Pressure altitude was 400 feet.

1.11.2.4. At reference time 00:41:15, the helicopter is found climbing. Pressure altitude increases.

1.11.2.5. At reference time 00:41:27, the warning landing gear 'not extended' changes to 'extended'. Pressure altitude is 448 feet. Pressure altitude increases to 496 feet.

1.11.2.6. At reference time 00:41:53, the pressure altitude is found decreasing. The helicopter attempts landing with landing gear extended.

1.11.2.7. At reference time 00:42:09, the helicopter lands. Pressure altitude is 400 feet.

**1.12. Wreckage and impact information:**

The helicopter touched on its belly but immediately climbed again. There were scrap marks on various places on the belly surface. There was no wreckage.

**1.13. Medical and pathological information:**

1.13.1. The pilot-in-command underwent Pre-flight Medical Examination in the morning of 24.07.2019 at Guwahati.

1.13.2. The first officer underwent Pre-flight Medical Examination in the morning 24.07.2019 at Guwahati.

**1.14. Fire:** There was no fire or smoke during or following the incident.

**1.15. Survival aspects:** The incident was survivable.

**1.16. Tests and research:** Nil.

**1.17. Organizational & Management Information :**

Pawan Hans Ltd is non-scheduled helicopter operator, a public sector under the Government of India. Its registered office is located in New Delhi. Its AOP no. is 02/1998. It is valid up to

14.03.2024. It has 42 helicopters in its fleet. The fleet consists of 15 Dauphin 2 helicopters, 15 Dauphin N3 helicopters, 03 Bell-206-L4 helicopters, 03 Bell-407 helicopters, 03 MI-172 helicopters and 01 Advanced Light helicopter (ALH).

## 1.18. Additional information:

### 1.18.1. Information from statement and questionnaire of Pilot-in-command (Pilot Flying):

Purpose of the flight of the helicopter VT-PHO was to impart training (recency checks) to the pilot-in-command. There was no snag on the helicopter before departure from Guwahati. Weather was fine for VFR flight. There was no difficulty in retracting the landing gear after take-off. There was no snag that appeared during the flight. There was no warning related to any system of the helicopter. The pilot-in-command did not carry out 'Pre-landing 'checklist and did not extend landing gear before touch down. The pilot-in-command did not check 'three green' indication for landing gear down before touch down. After the helicopter touched down on its belly, the examiner (other flight crew on the co-pilot seat) declared that controls of the helicopter were with him and he immediately made the helicopter to climb in a controlled manner and put the landing gear switch to down position. The landing gear was extended. The examiner then landed the helicopter. Further sortie was discontinued and the helicopter was taxied to dispersal for switch-off.

### 1.18.2 Information from statement and questionnaire of Co-pilot (Examiner / Pilot Non Flying):

Purpose of the flight was to undertake recency check for the pilot-in-command after break in flying for more than three months. There was no snag on the helicopter before departure from Guwahati. There was no snag appeared during the flight. There was no warning related to any system during flight. There was no difficulty in imparting training to the pilot-in-command. The 'Pre-landing' checks were not carried out. The landing gear was not extended initially. But after the incident when the landing gear switch was selected to down position, the landing gear extended without any difficulty.

### 1.18.3. Significance of Training / Flight switch in Cockpit:

When the 'Training/Flight' switch is selected to 'Training' position, it simulates the selected engine to idle rating, thereby simulating a single engine failure. The examiner had simulated left engine failure using this switch.

### 1.18.4. SOP/ Pre-Landing Checklist:-

| Sl. No. | Item | Action | Action by |
|---|---|---|---|
| 1. | LANDING GEAR | DOWN | PNF |
| 2. | ALL SWITCHES | AS REQ | PNF |
| 3. | PITOT HEATER | OFF | PNF |
| 4. | CAP | ALL OFF | PNF |
| 5. | 14 INFO | ALL GREEN | PNF |
| 6. | WX RADAR | STD BY | PNF |
| 7. | FUEL TX | OFF | PNF |
| 8. | LANDING LIGHT | ON | PF & PNF |
| 9. | PARKING BRAKE | AS REQ | PNF |

**1.19. Useful or effective investigation techniques:** Nil.

## 2. Analysis:-

**2.1. Maintenance aspects:** The Certificate of Airworthiness and Airworthiness Review Certificates were valid on the day of occurrence. The aircraft was airworthy. No major inspection, was due on the helicopter on the day of incident. All airworthiness directives, service bulletins and mandatory modification were compiled till date. There was no snag prior to departure of the flight. There were no warnings related to any system during the flight. There was no snag appeared during the flight. DFDR shows that 'Landing Gear Not Extended' warning appeared in cockpit. After the helicopter touched on its belly, it was made to climb using collective. The helicopter responded and climbed. The landing gear was extended to down position by the examiner. The landing gear extended to down position in the first attempt itself. After landing the helicopter taxied to the dispersal. This shows that there was no snag in the helicopter including the landing gear system. The helicopter was airworthy and serviceable. Maintenance aspect is not a contributory factor to the incident.

**2.2 Operational aspects:-**

The licences of flight crew were valid. The flight crew were appropriately qualified. They had undergone pre-flight medical check at Guwahati in the morning of 24.07.2019. It was negative and they were allowed to operate the flight. The flight crew had rested 16 hours before resuming duty on the date of incident. Their FDTL was within limit. Pilot-in-command was the pilot flying (PF)

and was under recency check. The co-pilot was examiner and pilot non flying (PNF). He was carrying out recency check for the pilot-in-command. The helicopter departed from Guwahati for recency check. The required manoeuvres were carried out by the pilot-in-command. Thereafter, the helicopter returned to Guwahati airfield for landing. During approach, left engine failure was simulated for practicing single engine approach. The pilot-in-command controlled and maneuvered the helicopter for single engine approach. As admitted by both the flight crew, they did not carry out the "pre-landing' checklist. Pre-landing checks requires action to extend the landing gear before landing. The flight crew did not check the 'three green' lights as indication to ensure that landing gear was extended before landing. There was a warning also in the cockpit for 'landing gear not extended'. The warning also went unnoticed. This resulted in touch down of the helicopter on its belly. The examiner (PNF) took over the controls and lifted up the helicopter in a controlled manner. Then he set the landing gear switch to down position and landed the helicopter safely.

**2.3. Human Factors:** The pilot-in-command had not flown the Dauphin SA 365 N3 helicopter in last 01 year. He had flown only type Ecureuil AS 350 B3 helicopter which has fixed skids as landing gears. Extension of landing gear is not required in this type of helicopter. He was not in a practice of extending the landing gears before landing. In the instant case the pilot-in-command did not extend the landing gears as per his yearlong practice. However, the examiner also failed to notice the deficiency on the part of pilot-in –command.

**2.4. Circumstances leading to the incident:** The flight crew did not carry out the 'Pre-landing' checklist before landing the helicopter. 'Pre-landing' checklist includes action that ensures extension of the landing gear. Warning of 'landing gear not extended' was also ignored. As the landing gear was not extended before touchdown, the helicopter touched down on its belly.

**3. Conclusion:**

**3.1 Findings:**

3.1.1. Weather was fine for VFR flight.

3.1.2. The helicopter did not have any pre-departure snag. There was no snag or warning related to any system failure during flight. The helicopter was airworthy and serviceable. Maintenance aspect is not a contributory factor to the incident.

3.1.3. The flight crew were appropriately qualified.

3.1.4. FDTL of the flight crew was within limit.

3.1.5. The flight crew did not carry out the 'Pre-landing' checklist and ignored the warning for ‘landing gear not extended’. The landing gear was not extended before touch down. As a result, the helicopter touched down on its belly.

3.1.6. The examiner took over the controls and lifted the helicopter. Further extended the landing gear and landed safely.

3.1.7. The pilot-in-command flew only type Ecureuil AS 350 B3 helicopter in last one year which has fixed skids as landing gears and does not require extension of landing gears before landing. His yearlong practice of not extending landing gear before landing was a contributory human factor.

**3.2. Probable cause:**

Non adherence of the ‘Pre-landing’ checklist and disregard the warning of ‘landing gear not extended’ by the flight crew resulted in touch down of the helicopter on its belly.

Human factor was contributory to this incident.

## 4. Safety Recommendation:-

Action as deem fit in view of the finding no. 3.1.5 by DGCA HQ.

(H.N Mishra)
Dy. Director Air Safety
(Investigator in-Charge)

Place : Kolkata
Date : 30.04.2020