

FINAL REPORT ON INCIDENT TO M/s INDIGO AIRLINES AIRBUS A320
AIRCRAFT VT-IGV AT BENGALURU ON 12/09/2013

- | | |
|------------------------------|--|
| 1. Aircraft Type | : Airbus A 320 |
| Nationality | : INDIAN |
| Registration | : VT - IGV |
| 2. Owner | : White Skye Leasing Limited, Ireland |
| 3. Operator | : Interglobe Aviation Ltd. |
| 4. Commander – in –Command | : ATPL holder on type |
| Extent of injuries | : Nil |
| 5. First Officer | : CPL Holder qualified on type |
| Extent of injuries | : Nil |
| 6. Place of Incident | : Bengaluru |
| 7. Date & Time of Incident | : 12 th September 2013 14:40 UTC |
| 8. Last point of Departure | : Delhi |
| 9. Point of intended landing | : Bengaluru |
| 10. Type of operation | : Schedule Operation |
| 11. Crew on Board | : 06 |
| Extent of injuries | : Nil |
| 12. Passengers on Board | : 111 |
| Extent of injuries | : Nil |
| 13. Phase of operation | : Landing |
| 14. Type of incident | : Aircraft veered right of center line after touch-down and ran over runway edge lights resulting in tyre deflation. |

(ALL TIMINGS IN THE REPORT ARE IN UTC)

SUMMARY:

M/s IndiGo Airlines A320 aircraft VT-IGV operating scheduled flight 6E-125(Delhi-Bengaluru) was involved in an incident at Bengaluru on 12/9/13. There were 117 passengers including six crew members on board the aircraft.

After the aircraft came in contact with ATC Bengaluru it was cleared for ILS approach R/W 27. The visibility reported was 1500 meters in rain. The ATC had cautioned flight 6E-125 for heavy rain over airfield with runway surface condition wet and wind 320 deg/06 Kts. The aircraft made a touch down right of center line and thereafter veered further to the right and in the process over ran 05 runway lights on the right shoulder of the runway. The pilot gave rudder correction and brought the aircraft back on the center of runway. Just after vacating the active runway on taxiway "F" the aircraft came to a complete halt and could not be moved forward even with the increase of engine power. The engines were shut down and ATC was requested for deplaning the passengers on the taxiway. Both the starboard side main landing gear wheels had deflated.

ATC permission was obtained and the passengers were disembarked normally on the taxi way "F". Since the aircraft had not fully vacated the basic runway strip, the runway was not available for aircraft operations. After both the main landing gear wheels were replaced, the aircraft was towed back to the bay. There was no injury to any of the occupants on the aircraft. There was no fire. Due to non-availability of runway for around 2Hr 44 Minutes a total of 24 flights were diverted.

The incident was reported by M/s IndiGo to DGCA immediately. DGCA ordered an Inquiry under rule 13 of Aircraft (Investigation of Accidents and Incidents), Rules 2012 to investigate into the cause of the incident.

1. FACTUAL INFORMATION.

1.1 History of the flight

M/s IndiGo Airlines Airbus A320 aircraft VT-IGV operating scheduled flight 6E-125(Delhi-Bengaluru) was involved in an incident at Bengaluru on 12/9/13. The flight was under the command of PIC holder of ATPL license with co-pilot both duly qualified on type. There were 117 passengers including six crew members on board the aircraft.

The flight crew had availed sufficient rest prior to commencement of flight for the sector Mumbai-Delhi-Bengaluru. The preflight medical with Breath Analyser test was carried out at Mumbai and found negative. Chocks off from Delhi was at time 12:05 UTC and got airborne at 12:20 UTC. The flight from Delhi to Bengaluru was uneventful.

During approach the aircraft came in contact with ATC, Bengaluru and was cleared for ILS approach R/W 27. The visibility was reported 1500 meters in rain. The ATC had cautioned 6E-125 about heavy rain over airfield and runway surface condition reported wet. The flight crew requested ATC for a wind check on short final and wind reported were 320 deg/06 Kts. Though the rains were heavy the PIC preferred to use rain repellent instead of wiper. The First officer was using the wiper. The airfield elevation is 3001 feet AMSL, runway 27 threshold elevation is 2917 AMSL and the DA(H) for the ILS Approach is 3120 (203)AMSL. The pilot disconnected autopilot at around 91 feet AGL. Thereafter he flew the aircraft manually. After touchdown on R/W the aircraft drifted towards right side runway edge and the starboard side main landing gear wheel hit 05 runway edge lights consecutively (i.e. at a distance of 700 meters from threshold R/W 27). Finally sharp correction to left was executed by PIC and the aircraft came back to Runway Centre. The aircraft vacated the runway at rapid exit taxiway 'F' which is at 2346 meters from the threshold R/W-27. The aircraft could not be taxied further by Pilots due both RH main wheels had deflated. At 14:42 UTC the flight crew had requested ATC for a runway inspection due suspected hitting of runway edge lights while landing.



Runway 09/27 Layout and Aircraft Final Rest Position

Airport follow me jeep had carried out runway inspection and reported 5 edge lights were broken on the northern side of R/W 27. At time 14:48 UTC Flight crew had reported ATC that unable to taxi further and requested for tow tractor. The IndiGo Engineering Department without assessing the damage on the RH main wheels, tried to tow the aircraft on to the bay. However the tow bar sheared off and the aircraft could not be moved. Thereafter the PIC requested ATC for disembarking of passengers at taxiway 'F'. The deplaning of the passengers finally commenced through passenger door normally at 16:05 UTC.

Since the aircraft had not fully vacated the runway holding point Rapid Exit Taxiway (RET) 'F', the runway was not available for aircraft operations for 2 hrs 44 minutes (from 14:40 UTC to 17:24 UTC). During this period 24 flights were diverted from Bengaluru out of which 16 flights to Chennai and 8 flights to Hyderabad. The deflated wheels were replaced at taxiway and aircraft was towed to parking stand 66 at 17:14 UTC.

There was no injury to any of the occupant on board the aircraft and there was no fire.

1.2 Injuries to persons.

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil
MINOR/ None	Nil	Nil	----

1.3 Damage to Aircraft.

During inspection both RH main wheel # 3 & # 4 were found damaged /deflated. Both the removed main wheels were inspected and no visible damage to crown portion of tyres was noticed. The side walls of the tyres had got adrift and moved sideways with reference to hub but were remaining attached to hub assembly. The brake assembly was inspected and found satisfactory. The damaged RH (#3 & #4) main wheel tyres including brake assembly were replaced. Other than this there was no damage to any part of airframe/engine/any other part of aircraft was observed and aircraft was released for further passenger flights on 13.09.2013.



Damaged Right main landing gear wheels

1.4 Other damage:

Consecutively 05 runway shoulder edge lights were damaged (i.e. at a distance of 700 meters from threshold R/W 27).



Damaged Runway shoulder edge light

1.5 Personnel information:

1.5.1 Pilot – in – Command:

AGE	:	58 years
License	:	Valid ATPL holder
Category	:	Aeroplane
Class	:	Multi Engine Land
Endorsements as PIC	:	A320
Date of Med. Exam.	:	08/07/2013
Med. Exam valid upto	:	07/01/2014
FRTO License	:	valid till 09 th April 2019
Total flying experience	:	9341 hours approx
Experience on type	:	4411 hours approx
Experience as PIC on type	:	4013 hours approx
Total flying experience during last 180 days	:	404:41 hours approx.
Total flying experience during last 90 days	:	233:03 hours approx.
Total flying experience during last 30 days	:	81:07 hours approx.
Total flying experience during last 07 Days	:	24:31 hours approx.
Total flying experience during last 24 Hours	:	04:37 hours approx.

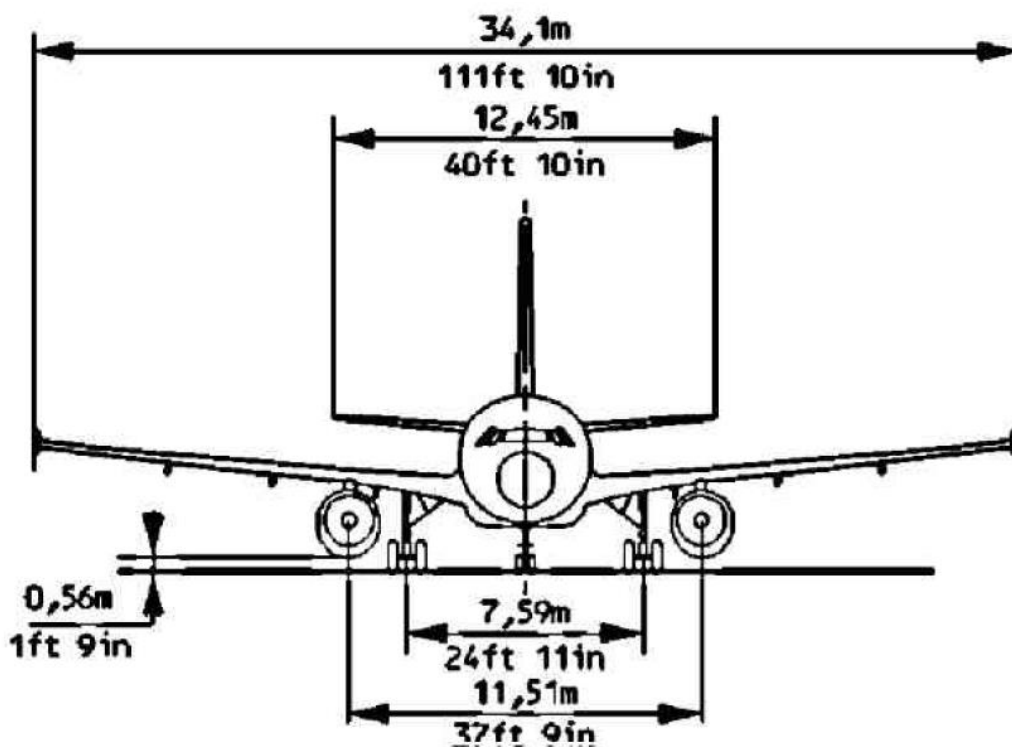
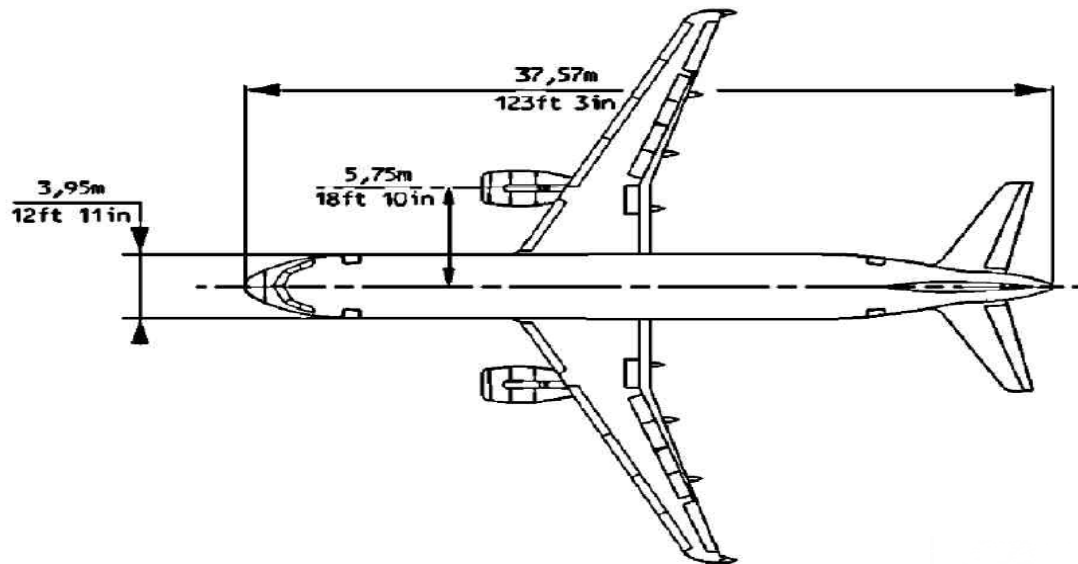
1.5.2 Co-Pilot:

AGE	:	24 years
License	:	Valid CPL holder
Category	:	Aeroplane
Class	:	Single Engine Land
Endorsements	:	Multi Engine as co-pilot (Airbus 320), Cessna 152
Date of Med. Exam.	:	11/07/2013
Med. Exam valid upto	:	10/07/2014
FRTTO License	:	Valid till 09 th December 2015
Total flying experience	:	832 hours
Experience on type	:	290:16 hours
Experience as PIC on type	:	NIL
Total flying experience during last 180 days	:	290:16 hours
Total flying experience during last 90 days	:	217:06 hours
Total flying experience during last 30 days	:	86:59 hours
Total flying experience during last 07 Days	:	16:55 hours
Total flying experience during last 24 Hours	:	08:06 hours

Both the operating crew were not involved in any serious incident/accident in past. Both the operating crew had adequate rest prior to roster for the incident flight.

1.6 Aircraft information:

The A320 is a subsonic, medium-range, civil transport aircraft. The aircraft has two high bypass turbofan engines manufactured by M/S International Aero Engines. The aircraft is designed for operation with two pilots and has passenger seating capacity of 180.



The aircraft is certified in Normal (Passenger) category, for day and night operation under VFR & IFR. The maximum operating altitude is 39,100 feet and maximum take-off weight is 73500 Kgs. The Maximum Landing weight is 64500 kg. The Aircraft length is 37.57 meters, wingspan is 34.1 meters and height of this aircraft is 12.14 meters. The distance between main wheel centre is 7.59 meters. The distance between engines is 11.51 meters and Engine Ground Clearance is 0.56 meters.

Airbus A320 aircraft VT-IGV (MSN 4481) had been manufactured in year 2010. The aircraft was registered with DGCA under the ownership of M/s White Skye Leasing Limited on 10.11.2010. The aircraft is registered under Category 'A' and the Certificate of registration No. 4143/2.

The Certificate of Airworthiness Number 6252 under "Normal category" subdivision Passenger / Mail / Goods was issued by DGCA on 10.11.2010. The specified minimum operating crew is two and the maximum all up weight is 73,500 Kgs. At the time of incident the Certificate of Airworthiness was current and was valid up to 09.11.2015

The Aircraft was holding a valid Aero Mobile License No. A-002/035-RLO(NR) at the time of incident. This Aircraft was operated under Scheduled Operator's Permit No S-19 which was valid up to 02.08.2017. As on 12th Sep. 2013 the aircraft had logged 9973:38 Airframe Hours and 6827 cycles. The Airbus A320 aircraft and its Engines are being maintained as per the maintenance program consisting of calendar period/ flying Hours or Cycles based maintenance as per maintenance program approved by Regional Airworthiness office, Delhi.

Accordingly, the last major inspection 2250FH/ 360 DAYS check carried out at 9966 Hrs/6822 cycles on 11.09.2013. Subsequently all lower inspections (Preflight checks, Service Checks, Weekly Checks) were carried out as and when due before the incident.

The aircraft was last weighed on 02.11.2010 at TOULOUSE, FRANCE and the weight schedule was prepared and duly approved by the office of Director of Airworthiness, DGCA, Delhi. As per the approved weight schedule the Empty weight of the aircraft is 42228.055 Kgs. Maximum Usable fuel Quantity is 18730 Kgs. Maximum payload with fuel tanks full is 12541.945 Kgs. Empty weight CG is 18.871 meters aft of datum. As there has not been any major modification affecting weight & balance since last weighing, hence the next weighing is due on 01.11.2015. Prior to the incident flight the weight and balance of the aircraft was well within the operating limits.

All the concerned Airworthiness Directive, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine has been complied with as on date of event.

Transit Inspections are carried out as per approved Transit Inspection schedules and all the higher inspection schedules include checks 1 inspection as per the manufacturer's guidelines as specified in Maintenance Program and are approved by the Continuing Airworthiness Manager (Post Holder for Continuous Airworthiness).

The last fuel microbiological test was done on 08.09.2013 at Delhi/Noida by ASHCO NIULAB INDUSTRIES LTD. and the colony count was within acceptable limits.

The left Engine S/N V15620 had logged 9974 Hrs. and 6827cycles and the right Engine S/N V15622 had logged 9974 Hrs. and 6827 cycles. There was no defect report on the engine on the previous flight.

1.7 Meteorological information:

The following is the Met report on the date of incident between 1330 UTC to 1530UTC

Time (UTC)	Wind Dir	Vis	Weather	Trend	Supp Info
1330	240/04	8000		NO SIG	FEW 025 CB
1400	180/04	8000		NO SIG	FEW 025 CB
1430	VRB04	6000	Rain in and around Local airfield	TEMPO	FEW 025 CB, RAIN
1433 (SPECI)	VRB05	3000		TEMPO	FEW 025 CB, SHRA
1434 (SPECI)	VRB05	1500		TEMPO	FEW 025 CB, TSRA
1443 (SPECI)	320/07	0800		TEMPO	FEW 025 CB
1500	VRB07	Becoming 1500		TEMPO	FEW 025 CB, TSRA
1530	270/10	1500			TEMPO

Weather warning was issued at 1415 UTC valid till 1830 UTC forecasting heavy rain with thunder showers, strong surface winds gusting to 30 kts from 290°.

1.8 Aids to navigation:

There is one single runway available at BIAL international airport, Bengaluru which has the orientation 09/27. The ILS is available for both the approaches for runway 09/27. PAPI is available for both sides of the runway. NDB is also available at BIAL for approach and landing. The ATC is controlled and manned by Airport Authority of India.

1.9 Communications:

There was always two ways communication between the ATC and the aircraft.

1.10 Aerodrome information:

BIAL- Bengaluru International Airport Limited

ICAO :VOBL

Co-ordinates

ARP : N 13.1989°

E 77.7056°

Elevation : 3001 Ft.

Runway Orientation and dimension

Orientation- 09/27 Dimension 4000 x 45 (M)

R/W & Taxi Tracks Markings Standard as per Annex- 14

Approach and Runway Lighting

RWY.	HIALS (APCH LGT)	THR LGT	PAPI	Rwy Centre Line LGT	HIRL (RWY edge LGT)
09	CAT-I	Yes	Yes (3 degrees)	No	Yes
27	CAT-I	Yes	Yes (3 degrees)	No	Yes

All runway lights were serviceable prior to landing of Indigo aircraft flight 6E-125 on 12.09.2013.

Met Services

Met Office Hour of service is 24 Hrs. TAF, Trend Forecast and Briefing is available. Flight documentation is provided in Chart and Tabular form in English language.

Navigation and Landing Aids

NDB, DVOR, ILS CAT-I

ATS Communication Facilities

Bengaluru Radar	128.67 MHZ
Bengaluru Approach	121.25/127.75 MHZ
Bengaluru Tower	124.35 MHZ
Bengaluru Ground	121.65 MHZ

1.11 Flight recorders:

The Cockpit Voice Recorder (CVR) and the Digital Flight Data Recorder (DFDR) was downloaded and the following information was available from them

CVR: Make: Honeywell, Part No. 9806022-001, S/N: CVR 120-13444

1. Both the cockpit crew were discussing the weather and also the prevailing rain over the airfield area. The PIC confirmed continuing with the approach.
2. During cockpit discussion it is known that the PIC was not using wipers during approach and landing. However the F/O was using the wipers.
3. The Autopilot disconnect is late and comes approx. 20 sec after the minimums auto call out.
4. After touch down, the F/O noticed that the aircraft was veering to the right of center line and called out '**left left left**' and **after a pause, 'right'**. These were non-standard call-outs made by the F/O.
5. After the aircraft brought back onto the center line there is a discussion in the cockpit of hearing unusual sound from the undercarriage.
6. The F/O also informed the PIC that they had probably gone off the runway and should inform ATC for runway inspection.
7. The PIC informed ATC that they had overrun the runway shoulder edge lights and the runway needs to be inspected.
8. The PIC informed ATC that they cannot clear the taxi way F holding point position under engine power and needs tow track assistance.

DFDR: Make: Honeywell, Part No. 980-4700-042, S/N: SSFDR-18395

Time(UTC)	Event
14:38:21	Aircraft is Configured for landing.
14:38:47	Aircraft Stabilized with engines spooled up.
14:39:02	1000 Feet RA aircraft on profile, speed Vapp & ROD 700 Feet / Min & Engines spooled up.
14:39:46	500 Feet RA aircraft on profile, speed Vapp + 7 Kts & ROD 770 Feet / Min & Engines spooled up.
14:40:15	106 Feet RA aircraft on profile, speed Vapp + 2 Kts & ROD 670 Feet / Min & Engines spooled up
14:40:16	At 91 Feet RA Auto Pilots disengaged and manual control taken over by PIC.
14:40:20 to 14:40:27	From 36 Feet RA to touchdown steady increase in Localizer deviation from L0.0806 to L0.2722. During this period roll command from Capt recorded (no steady input, momentary inputs with max of 7.6 Deg to left and 9.8 Deg Right recorded, full stick deflection being 20 Deg). No significant variation in aircraft roll recorded during this period.
14:40:27 to 14:40:28	Touchdown on MLG right of centerline. Pitch was 9 Deg., roll 0.4 Deg. Heading at touchdown was 275 Deg. The Localizer deviation increased to L0.3730 within one second of touchdown.
14:40:29 to 14:40:41	During this period positive rudder deflection recorded, with maximum of 22.7 Deg at 14:40:29(full deflection being 28 Deg). At 14:40:30 nose wheel touchdown and max reverse deployed. Also recorded is the reduction in aircraft heading from 275 to 262 by 14:40:32 and then again back to 271. The aircraft ground speed during this reduced from 125 Kts to 72 Kts.

1.12 Wreckage and impact information.

There was no major damage to the aircraft. However during landing the RH side main landing gear wheels over ran the runway shoulder lights which resulted into the deflation of both wheels. Other than this there was no other damage on the aircraft.

1.13 Medical and pathological Information:

Both the cockpit crew had undergone preflight medical check prior to the flight and was found satisfactory.

1.14 Fire:

There was no fire after the incident.

1.15 Survival aspects:

The incident was survivable.

1.16 Tests and research: NIL

1.17 Organizational and management information:

M/s IndiGo is a scheduled airline with a current fleet of 70 Airbus A-320 aircraft operating flights on domestic and international sectors. The company is in operation from last 07 years. The Company is headed by CEO assisted by a leadership team of professional of various departments. The flight operation is headed by V.P. Flight Ops who holds current license on Airbus A-320. The Flight Safety Department is headed by Chief of Flight Safety approved by DGCA who is a pilot with a current license of Airbus A-320. The Chief of Safety reports directly to the CEO.

1.18 Additional information:

1.18.1 Emergency Response Programme (ERP):

Ground handling at Bengaluru was carried out by M/s IndiGo airline. During investigation it was known that the Airline has not developed any module in the Emergency Response Manual, Standard Operating Procedures/guidelines for the removal of disabled aircraft in case of any emergency. The Bengaluru airport operator BIAL has an emergency response program, however it is not interfaced with any of the airlines which are operating in or out of Bengaluru Airport.

1.18.2 Closure of active runway:

Due to non-availability of clear cut responsibility shared between BIAL and M/s IndiGo airlines regarding removal of disabled aircraft, the aircraft operations was suspended for around 2Hr 44 Minutes and a total of 24 flights were diverted during this period.

1.18.3 Training Procedures for adverse weather conditions

Indigo has training procedures for monsoon / adverse weather conditions in their operations manual. As per the procedures, the Academic Training is carried out for initial endorsement, upgrade training and recurrent training. CFIT exercises are included in the recurrent training profiles. The Simulator Training is also carried out for initial endorsement, instrument, rating and license renewal. The Pilots are evaluated for instantaneous reactions to warnings of the GPWs. The Monsoon-Training is carried out in accordance with CAR on AWO: Adverse Weather Operations – Monsoon Operations.

Ground school training to all Pilots irrespective of the fact that they may have flown during previous / earlier monsoon periods is provided. The ground training covers the following:

- Aircraft Performance during Take-off and Landing with specific emphasis on wet and contaminated runway conditions.
- Calculation of take-off and landing field lengths and impact of individual failure events, specific to aircraft type.
- Indian Monsoon Climatology.
- Techniques of Weather Avoidance.
- Use of Weather Radar (type specific)
- ALAR & Adverse Weather Tool Kit (earlier issued by DGCA). Additionally, Operators not in possession of this shall see this information through the Flight Safety Foundation's website. It is mandatory for all pilots to be given training on this tool-kit and be individually issued the course contents and the CD by the Operator. The module of ALAR Tool-kit shall be reviewed every year along

with recent experiences of related exceedances of related exceedances and incidents, in the course of annual technical refresher.

- Detailed briefing on CANPA approaches and procedures.

The IndiGo procedures for Adverse Weather Operations / Monsoon Operations do not clearly define the use of wipers, in case of heavy monsoon conditions. However, the same is reflected in the Airbus procedures.

1.19 Useful or effective investigation techniques: NIL

2. ANALYSIS

2.1 Serviceability of the aircraft:

Airbus A320 aircraft VT-IGV (MSN 4481) was manufactured by M/s Airbus, France in year 2010. The aircraft is registered under the ownership of M/s White Skye Leasing limited, Ireland the Certificate of registration No. 4143/2, under category 'A' was issued on 10.11.2010. On the day of incident the aircraft VT-IGV had logged 9973:38 airframe hours and 6827 cycles.

The aircraft was holding a valid Certificate of Airworthiness Number 6252 issued under normal category sub-division Passenger / Mail / Goods by DGCA on 10.11.2010 and was valid up till 09.11.2015. The aircraft is holding Aero mobile License No. A-002/035-RLO (NR) and was valid on the day of incident. This aircraft was operated under Scheduled Operator's Permit No. S-19 and which was valid till 02.08.2017. Prior to flight the Aircraft was holding a valid Certificate of Flight Release.

The aircraft was last weighed on 02.11.2010 Toulouse, France. There was no major modification carried out on the aircraft affecting weight & balance. The aircraft and Engines were being maintained under continuous maintenance as per maintenance program consisting of calendar period based maintenance and flying Hours/ Cycles based maintenance as per maintenance program approved by

Regional Airworthiness office, New Delhi. The last major inspection 2250 FH/ 360 Days inspection was carried out at 9966 Hrs/6822 cycles on 11.09.2013. Subsequently all lower inspections/schedules, till the last flight prior to incident was carried out as per the maintenance programme.

All the concerned Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine were found complied with. Transit Inspections are carried out as per approved Transit Inspection schedules and all the higher inspection schedules include checks 1 inspection as per the manufacturer's guidelines as specified in Maintenance Program and are approved by the Continuing Airworthiness Manager (Post Holder for Continuous Airworthiness).

There was no in-flight disintegration of any part of the aircraft and it was confined around its final rest position. At no point the aircraft left the paved runway surface, however 05 runway edge light were damaged by RH main landing gear. There was no other visible damage on the aircraft. DFDR analysis was carried out and it was observed that after touchdown the aircraft drifted towards the right however adequate rudder correction was applied by the PIC and the aircraft was brought back to the centreline. Prior to the incident flight the aircraft had operated flight Mumbai - Delhi and no snag was reported on the aircraft.

In view of the above, it is inferred that the serviceability of the aircraft is not a factor to the incident.

2.2 Weather:

At departure from Delhi, the weather was fine with clear skies. The aircraft took off for Bengaluru at around 12:20 UTC. While inbound Bengaluru, at around 1437 UTC 6E125 reported Bengaluru tower on ILS runway 27. The tower immediately cleared 6E125 for landing runway 27 with winds 360/06 kts. The tower also cautioned

6E125 about heavy rain over the airfield and runway surface wet. At short finals 6E125 requested tower for wind check which was reported as 320/06 kts.

As per the METAR at 1400 UTC the visibility reported was 8000 m and by 1430 UTC the visibility had reduced to 6000 m in rain. At 1415 UTC a weather warning was issued from 1430 to 1830 UTC. At 1430 UTC, the visibility had reduced to 6000 m in rain. A SPECI was issued after 03 minutes at 1433 UTC due to heavy rain fall over the airfield and visibility reducing to 3000 m in rain. Another SPECI was issued after 01 minute at 1434 UTC as the weather had further deteriorated and the visibility had reduced to 1500 m in rain, however the winds remained around 05 knots.

Both the cockpit crew stated that they saw the runway at decision altitude and hence continued for landing. Even though it was raining heavily, the PIC was using rain repellent and had not put on the wipers. However the first officer was using wipers. The aircraft landed right of center line and due prevailing heavy rain the visibility of the PIC was affected and before he could apply correction to bring the aircraft on center line, the aircraft veered further right and over ran 05 runway shoulder edge lights.

From the foregoing, it is inferred that weather is a contributory factor to the incident since the PIC vision was impaired due heavy rain which eventually resulted in to the incident.

2.3 Pilot handling of the aircraft:

On 12.09.2013 M/s IndiGo Airlines A320 aircraft VT-IGV was operating a scheduled flight 6E-125(Delhi-Bengaluru). The aircraft was airborne at Delhi Airport at time 12:20 UTC. The flight from Delhi to Bengaluru was uneventful.

During approach the aircraft came in contact with ATC, Bengaluru and was cleared for ILS approach R/W 27. The visibility was reported 1500 meters in Rain and had cautioned 6E-125 about heavy rain over airfield and runway surface condition WET. The crew was fully aware of the prevailing weather conditions and continued approach. The LOC/GS was intercepted, on profile. Aircraft was on profile at check heights of 1000', 500', 100' above minima. Though the rains were heavy the PIC preferred to use rain repellent only. As per standard practice it is always advisable to use wiper during heavy rains as it provide better visibility over rain repellent. The First officer was using the wiper.

The pilot disconnected autopilot very late at around 91 feet AGL which is not as per the Company's Standard Operating Procedures and thereafter he flew the aircraft manually. However during manually flying the aircraft deviated from the localizer and drifted toward the right. The 09/27 runway at Bengaluru is a CAT 1 runway and the

center line is not illuminated. The PIC did a wind check on short final which was reported as 320 deg/06 Kts and winds were not very significant. The aircraft landed right of centerline. Since it was raining heavily and the PIC was not using wiper his vision was impaired. The first officer gave non-standard correction call-outs calling out 'left left left' and after a pause, 'right' instead of calling-out that they were right of center line. This possibly confused the PIC and delayed the corrective action. As a result the aircraft veered further right and overran the runway shoulder edge lights before the PIC gave correction and brought the aircraft on the center of the runway.

Investigation further revealed that the co-pilot was released for flying duties 06 months prior to the incident flight and had accumulated 290 hrs on type. After his release as first officer this was his first experience of monsoon flying. The non-standard call outs by the first officer were probably due inadequate experience. The PIC had total experience of 9341 hrs out of which 4013 hrs was as PIC on type.

From the above it is inferred that the PIC failed to use wiper with prevailing heavy rains which impaired his vision and eventually resulted into the incident. Hence PIC handling of the aircraft is a factor to the incident.

2.4 Circumstances leading to the Incident :

At around 14:37 UTC 6E-125 contacted Bengaluru ATC. The ATC cleared 6E-125 for ILS approach runway 27. The ATC reported visibility as 1500 meters with heavy rains over the airfield area. During finals the PIC did not switched ON the wiper even though it was raining heavily and had only relied on the rain repellent. The PIC did not realize the fact that for heavy rains, the wipers are more effective than the rain repellent. The runway 09/27 at Bengaluru is a CAT 1 runway i.e. the center line is not illuminated. Further the PIC continued approach and disconnected autopilot very late at around 91 feet AGL and thereafter flew manually. Since auto-pilot disconnections were late, before the PIC could control the aircraft effectively, the

auto call outs had generated for landing. The aircraft landed around 12 meters right of center line. As the centerline was not illuminated and the PIC vision was slightly impaired due heavy rains, the PIC was following the callouts of the copilot. The copilot made non-standard correction callouts which delayed & possibly confused the PIC actions to directionally control the aircraft and in the process overran the runway shoulder edge lights and resulted into the incident.

3 CONCLUSIONS:

3.1 Findings:

- a) The Certificate of Airworthiness and the Certificate of Registration of the aircraft was valid on the date of incident.
- b) The certificate of flight release was valid on the day of incident.
- c) Both the pilots were appropriately qualified to operate the flight.
- d) All the concerned Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine were found complied with.
- e) Prior to the incident flight the same crew had operated a flight Mumbai-Delhi and there was no snag reported on the aircraft.
- f) As per the METAR at 1400 UTC the visibility reported was 8000 m. At 1415 UTC a weather warning was issued from 1430 to 1830 UTC.
- g) At 1430 UTC, the visibility had reduced to 6000 m in rain. A SPECI was issued after 03 minutes at 1433 UTC due to heavy rain fall over the airfield and visibility reducing to 3000 m in rain. Another SPECI was issued after 01 minute at 1434 UTC as the weather had further deteriorated and the visibility had reduced to 1500 m in rain, however the winds remained around 05 knots.
- h) At 1437 UTC ATC cleared VT-IGV for ILS approach runway 27 with prevailing visibility 1500 meters in rain and informed heavy showers over the airfield.
- i) The ILS procedure was executed, as per Standard Operating Procedure by the operating crew.
- j) Though the rains were heavy, the PIC preferred to use rain repellent only. However, the First officer was using the wiper.
- k) The PIC did not disconnect the autopilot at DA and continued approach. The autopilot was disconnected at 91 AGL.
- l) The aircraft made a touch down right of center line and thereafter veered to the right and in the process over ran 05 runway lights on the right shoulder of the runway.

- m) After touch down since the vision of the pilot was impaired due heavy rain, the pilot could not maintain the directional control of the aircraft.
- n) The PIC actions for directional control were compromised due nonstandard call outs from the first officer.
- o) The speed brakes deployed normally and maximum reverse thrust was applied by the PIC and rudder correction was given to bring the aircraft back on the center of the runway.
- p) The aircraft vacated the active runway at rapid exit taxiway 'F', however it stopped short of basic strip clearance. The aircraft could not be taxied further as both RH main wheels had deflated.
- q) ATC permission was obtained and the passengers were disembarked normally on the taxi way "F". Since the aircraft had not fully vacated the basic strip, the runway was not available for aircraft operations for around 2Hr 40 Minutes and a total of 24 flights were diverted.
- r) There is no ERP for removal of disable aircraft existing in M/s IndiGo Airlines.
- s) After both the RH main landing gear wheels were replaced the aircraft was towed back to the bay.
- t) There was no injury to any of the occupants on board the aircraft.
- u) Weather was a contributory factor to the incident.


3.2 Probable cause of the Incident:

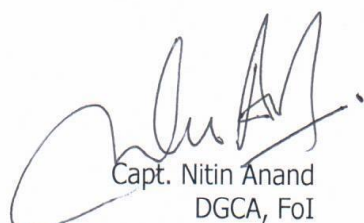
The PIC while landing in marginal visibility condition in heavy rain on a wet runway landed right of center line, veered further right and over ran runway shoulder edge lights before the aircraft was controlled directionally.

PIC not using wipers in heavy rain conditions with marginal visibility impaired his vision and is a contributory factor to the incident.

4 SAFETY RECOMMENDATIONS:

1. DGCA Hqrs may define appropriate corrective training for the operating crew as deemed fit.
2. DGCA Hqrs may advise M/s IndiGo Airlines training division to include a module in all-weather training regarding importance of windshield wipers in heavy rain conditions.
3. Operations department of M/s IndiGo Airlines to issue circular regarding use of standard callouts during conduct of flight especially during marginal weather conditions.
4. DGCA Hqrs may advise M/s. IndiGo Airlines to interface their Emergency Response Program with the Airport operator M/s BIAL and also include procedures for removal of disabled aircraft in company Emergency Response Manual.


Sh. A X Joseph
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Inquiry Officer, VT-IGV


Capt. Nitin Anand
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04/2/2014