FINAL INVESTIGATION REPORT OF PILOT INCAPACITATION DURING FLIGHT ON M/S INDIGO AIRCRAFT VT-IAR WHILE OPERATING SECTOR KOLKATA-HYDERABAD ON 27th APRIL 2017

AIRCRAFT ACCIDENT INVESTIGATION BUREAU
MINISTRY OF CIVIL AVIATION
GOVERNMENT OF INDIA

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 11 of Aircraft (Investigation of Accidents and Incidents), Rules 2012 of India. 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.

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1.	Aircraft Type	A-320
2.	Nationality	INDIAN
3.	Registration	VT - IAR
4.	Owner	Good Fly Leasing Limited
5.	Operator	IndiGo Airways
6.	Pilot – in –Command	ATPL Holder
7.	Co-Pilot	CPL Holder
8.	Place of incident	While operating flight (Kolkata-Hyderabad)
9.	Last point of Departure	Kolkata
10.	Intended place of Landing	Hyderabad
11.	Date of incident	27.04.2017
12.	Passengers on Board	180
13.	Extent of Injuries	NIL
14.	Crew on Board	02+04
15.	Extent of Injuries	NIL
16.	Phase of Operation	Cruise
17.	Type of Incident:	Pilot Incapacitation

1.0 Factual information

1.1 History of Flight

On 27.04.2017, an A-320 aircraft was involved in a diversion due to flight crew incapacitation while operating a flight from Kolkata to Hyderabad. After contacting ATC Bhubaneswar the aircraft made a safe landing at Bhubaneswar. There were 180 passengers and 06 crew members on board the aircraft.

Earlier in the day, on 27.04.2017 the flight crew had operated a scheduled flight from Delhi to Kolkata. First officer was having mild throat irritation before operating the flight. First Officer was authorized for carrying out supervised take-off and landing and the PIC was authorized to impart supervised take-off and landing however the take-off from Delhi was carried out by the PIC due to weather. The flight was delayed for about 02 hrs from its scheduled time and took off at around 1849 IST. The aircraft landed at Kolkata at around 2105 IST Landing at Kolkata was carried out by the First Officer. The flight was uneventful.

After around half an hour (turnaround time), flight took off from Kolkata for Hyderabad and take-off was carried out by First Officer. Till almost 35 minutes of flight after take-off, everything was normal. After crossing Bhubaneswar, while the aircraft was cruising the First Officer drank some water but it came out. He again tried to have water but again it came out. He felt irritation in the throat and was unable to drink water. His hands and feet became stiff. After 02-03 minutes he had blurring of vision and thereafter he went unconscious. PIC tried to wake him up and enquired if everything is all right.

Captain called Lead Cabin attendant inside the cockpit. Lead Cabin attendant along with another cabin attendant entered the cockpit and tried to revive the First officer. He remained unresponsive. First Officer’s seat was reclined and shoulder harness was put on to ensure that he did not touch the controls inadvertently. Oxygen was administered to the First officer using Quick Donning mask (QDM) with the help of Lead Cabin Attendant and another cabin attendant. Blood was found coming out of First Officer’s mouth.

Lead Cabin attendant paged for a doctor due to a passenger falling unconscious on board but there was no response from the passengers. PIC

informed ATC about the medical emergency and announced MAY DAY and initiated diversion to Bhubaneswar. PIC also informed Bhubaneswar ATC that First officer experienced symptoms similar to fits and requested Tower to arrange a doctor on arrival.

First officer recovered approximately 10 minutes after the initial symptoms began. PIC advised the First officer to take rest with his seat reclined and breathing oxygen through the mask. No company pilot was on board travelling as ACM or as passenger on board the aircraft. The PIC carried out the duties of both PF and PM and proceeded with the diversion to Bhubaneswar.

Aircraft landed safety and was taxied to the bay. After the aircraft stopped at the bay, oxygen mask of the first officer was removed. The passengers were held back before disembarkation as the First Officer was probably examined by the airport doctor in the cockpit. After preliminary checkup the First Officer though reluctant was probably provided wheelchair for disembarkation. On ground he was taken into the ambulance where medical team was available and the First Officer was taken to Medical facility of the airport.

1.2 Injuries to persons

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil
NONE	06	180	Nil

1.3 Damage to Aircraft

Nil

1.4 Other Damage

Nil

1.5 Personnel Information

1.5.1 Pilot – in – Command

Age	27 years
License	valid ATPL holder
Med. Exam valid upto	27.10.2017
Total flying experience	4752:42 hours
Last flown on type	27.04.2017
Total flying experience during last 06 months	316:11 hours
Total flying experience during last 30 days	70:31 hours
Total flying experience during last 07 Days	31:27 hours
Total flying experience during last 24 Hours	05:07 hours
Rest Before Duty	16:32 hours

1.5.2 Co-Pilot:

AGE	31 years
License	CPL holder
Date of Med. Exam.	20.06.2016
Med. Exam valid upto	19.06.2017
Total flying experience	1527:37 hours
Total flying experience on type	1327:46 hours
Last flown on type	27.04.2017
Total flying experience during last 180 days	354:56 hours
Total flying experience during last 30 days	77:46 hours
Total flying experience during last 07 Days	25:57 hours
Total flying experience during last 24 Hours	03:31 hours
Rest before duty	16:32 hours

1.6 Aircraft Information

Not applicable

1.7 Meteorological information

Not applicable

1.8 Aids to navigation

The flight was from Kolkata to Hyderabad and diverted to Bhubaneswar. In between at the time of occurrence the flight was in the Kolkata FIR. All these airports are having required navigational aids and no NAVAID was under NOTAM.

1.9 Communications

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

1.10 Aerodrome information

Not Applicable

1.11 Flight Recorders

The aircraft was equipped with SSCVR and SSFDR. As per the SSFDR readout the aircraft was cruising at FL360 before initiating diversion to Bhubaneswar. Aircraft was fully configured in "Config" full and landing gear down at 1500 feet RA. ILS approach was carried out in Bhubaneswar. Aircraft was fully stabilized with engines spooled up at 1000 feet RA.

SSCVR was not removed after the occurrence.

1.12 Wreckage and impact information

Nil

1.13 Medical and pathological Information

The first officer after operating sector Hyderabad-Delhi-Ranchi-Delhi on 26.04.2017, i.e. the previous day of the incident flight checked into hotel at about

2330 hrs IST and after having dinner went to sleep at about 0030hrs IST (27.04.2017). After sound sleep, the first officer got up at 1030 hrs IST, fully fit, had his breakfast in the hotel and got his lunch packed before leaving for the airport at about 1615 hrs IST. He underwent preflight medical examination including Breath Analyser (BA) test. The result of the BA test was negative.

The flight for the sector Delhi-Kolkata took off at around 1849 hrs and the first officer did supervised landing at Kolkata. The First officer did not face any problem while operating the Delhi-Kolkata sector. The flight for sector Kolkata-Hyderabad took off at around 2135 hrs IST and approximately 30 – 35 minutes into the flight, (as per his statement) the first officer, while taking water felt irritation in the throat. Thereafter he went in to unconsciousness. As per statement of PIC and Lead Cabin attendant, the First officer had an episode of seizure, his hand and feet became stiff, his body was shaking, eyes were open & fixed and he was unresponsive to verbal and physical stimuli. Blood stains (?Tongue Bite) from the side of the mouth were also observed. The first officer regained consciousness 10 minutes after the symptoms began and further he took 10 minutes to orient himself to what was happening. During the episode his pulse rate was 90 – 100 per minute, BP was not checked and he was administered oxygen by putting QDM selected on emergency mode. Seeing the condition of the First Officer, the PIC decided to divert to Bhubaneswar.

On landing at Bhubaneswar the first officer was examined by a doctor in the cockpit and he was taken out of the aircraft in a wheelchair. At the airport he was examined by airport doctor, who gave symptomatic treatment and provisionally diagnosed him as a case of hypertension, haemetemesis. He was advised clinical investigations for further evaluation. Thereafter the first officer was taken to Apollo Hospital, Bhubaneswar where he was administered I/V fluids and was diagnosed as a case of ? Seizure. He was referred to Department of Neurology for further evaluation and management. He was evaluated by a Neurologist at a Private hospital in Noida. During evaluation, EEG was normal, CEMRI brain was normal. Incidentally he was detected having Vitamin B12 and Vitamin D deficiency. Ultrasound (abdomen and pelvis) showed cholelithiasis and

sludge and cystitis with significant post void residue. The first officer underwent optical urethrotomy on 02.09.2017 and laparoscopic cholecystectomy on 11.10.2017.

Further, he was evaluated at AFCME, New Delhi. After evaluation he was recommended temporary unfit for 04 weeks on account of loss of consciousness under investigation; cholelithiasis operated; Stricture urethra operated; and vitamin B12 & vitamin D deficiency. He was advised review with opinion of neurologist, cardiologist, urologist and GI surgeon along with 2D ECHO, TMT and holter reports.

1.14 Fire

There was no fire.

1.15 Survival aspects

The incident was survivable.

1.16 Tests and research

Nil

1.17 Organizational and management information

The aircraft was operated by an SOP holder holding a valid SOP with the aircraft endorsed. The maintenance of the aircraft is carried out under CAR 145 approval.

1.18 Additional information

Flight crew incapacitation is a real safety hazard that occurs more frequently than many of the other emergencies. Incapacitation can occur in many forms. Sometimes the flight crew does not have any symptom before incapacitation. Incapacitation can occur in all age groups and during any phase of flight. Incapacitation may be either obvious or subtle, so it is important to remain alert for either. If the cockpit is managed in a disciplined manner in

compliance with operating procedures, then a procedural deviation might very well be the first indication of pilot incapacitation. Obvious incapacitation is generally easy to detect and more likely to be of a prolonged nature. Subtle incapacitation is considered a more significant operational hazard because it may go undetected.

In order to help with the early detection of flight crew incapacitation, the Crew Resource Management (CRM) principles should be applied: - Correct crew coordination that involves routine monitoring and aural crosschecks. The absence of standard callouts at the appropriate time may indicate incapacitation of one flight crewmember - If one flight crewmember does not feel well, he must inform the other flight crewmember. Other symptoms, for example incoherent speech, a pale and (or) fixed facial expression, or irregular breathing, may indicate the beginning of incapacitation.

The relevant extracts from Company Operations Manual Part A, SEP Manual & Flight Crew Technique Manual are as follows:

1.18.1 Company Operations Manual Part A

a) Two verbal communication rule - When a fight crew member does not respond normally or appropriately to two verbal communications, incapacitation should be suspected. Incapacitation should also be suspected if a crew member does not respond to any verbal communication associated with a significant deviation from the intended flight path.

b) Flight crew member incapacitation

If a cockpit crew member becomes incapacitated, the remaining flight crew member will ensure a safe flight condition by the following priority.

- **F**ly the airplane by taking control of the aircraft: use max automation; Check position of all essential controls and switches.

- **N**avigate the airplane by ensuring that the aircraft is in the determined flight path.
- **C**ommunicate and declare an emergency explaining the situation; Call the Lead Cabin crew to assist with the incapacitated crew member; Inform Central Operations Control.

Once the safety of the aircraft is certain, the remaining flight crew will

- Ascertain the facts e.g. a crew member is incapacitated.
- Evaluate the options e.g. Can continue to destination / divert to departure / enroute alternate
- Analyse the risk e.g. analyse the risks involved with each of the three options
- Make and execute decision

As soon as practicable call the lead Cabin crew to the cockpit for assistance and

- **Explain the n**ature of Problem
- Communicate intentions about further flight
- Give Estimates - Time to land
- Inform if evacuation is required/Not required

c) Cabin crew shall remain in the cockpit to take care of the incapacitated crew.
The lead cabin crew must do the following:

- Tighten & manually lock the shoulder harness of incapacitated crew
- Pull the seat completely aft
- Recline the seat back rest

d) Incapacitated cockpit crew member should be removed from the cockpit before administrating any medical assistance. In coordination with the lead

cabin crew, check if a type qualified company pilot is on board to replace the incapacitated crew member.

e) Get incapacitated crew member offloaded to the ambulance as quickly as possible. This could be at the gate / bay.

1.18.2 Safety & Emergency Procedures Manual

The Lead (Senior Cabin Crew) nearest cabin crew to enter the cockpit with a note pad and pen (press # to enter or use emergency code, if required)

- Ensure affected pilot's seatbelt is fastened.
- Secure hands into the shoulder harness and lock it.
- Move pilot's feet away from the rudder pedals.
- Move the seat completely aft using the electrical switches or manual levers, if required.
- Recline the seat back completely.
- Loosen tight clothing, follow first aid procedures and administer oxygen from the QDM on emergency mode (if required).

The Lead (Senior Cabin Crew) should read the cockpit checklist if required whilst sitting on the observer seat. After reading out the checklist, the Lead (Senior Cabin Crew) must occupy her jump seat.

1.18.3 CAR Section 7, Series C, Part I dated 12.10.2017

DGCA has issued CAR Section 7, Series C, Part I dated 12.10.2017 on Medical requirements and examination for flight crew licences and ratings. Para 4.10 and 4.11 of CAR deals with the occurrences covering flight crew in-flight incapacitation and are reproduced below.

4.10 Cases of In-flight in-capacitation shall be reported by the operator to DGCA (Attn: DMS (CA), Medical Cell).

4.11 In-flight incapacitation cases of shall be fully evaluated at Special Medical Examination Centres specified in Para 3.1.1 (v). During medical assessment, areas of increased medical risk shall be identified and the cases shall be followed up with continuous re-evaluation of the medical assessment to concentrate on the identified areas of increased medical risk and records maintained.

1.19 Useful or effective investigation techniques:

Nil

2. Analysis

2.1 General

Both the operating crew were appropriately licensed and qualified to operate the flight. The aircraft was having a Valid Certificate of Airworthiness at the time of incident. The Aircraft held valid Certificate of Release to Service which was issued at the airport of departure. Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications has been complied with.

The weather at the airport at the time of incident was fine and is not a contributory factor to the incident.

2.2 Actions in case of incapacitation

Safety and Emergency Procedures Manual as well as Operations Manual Part A contain the actions required by Flight crew and cabin crew in order to carry out safe landing. The procedure required was followed by the cockpit crew in coordination with the cabin crew. The PA call “Lead to the cockpit” was made immediately after First officer seemed unresponsive verbally and upon touching by the Captain. Thereafter Lead Cabin attendant and L2 cabin attendant tried to revive the First officer who was not responding to their attempt to revive him. Hence, his seat was reclined back and he was tightly harnessed in his seat to

ensure that the incapacitated crew does not interfere with the aircraft controls. Oxygen was administered through Quick donning mask.

All the safety actions were taken by the crew in view of the incapacitation.

2.3 Operational Handling of the Flight

The First Officer has shown symptoms of pilot incapacitation approx. after 30-35 minutes of the flight. Time wise the **approximate** aircraft position was as follows:

1623 UTC	:	Take-off from Runway 19L in Kolkata
1655 UTC	:	Top of Climb (FL360)
1700 UTC	:	Diversion initiated
1718 UTC	:	Aircraft landed on Runway 14 in Bhubaneswar

PIC seeing the condition of the First Officer announced “Mayday” and correctly decided to divert to Bhubaneswar. First officer regained consciousness after approximately 10 minutes. He was allowed to rest inside the cockpit after his seat was pushed back, harness tightened and breathing oxygen from QDM. No company pilot was travelling as an ACM or as a passenger. Hence, Captain was on controls for the rest of the flight. Aircraft was landed safely and taxied to bay safely.

One of the cabin crew could have been in the cockpit till approach at Bhubaneswar.

2.4 Medical Scenario and Circumstance leading to the incident

On the day of occurrence, the first officer got up at 1030 hrs IST in the hotel after having 10 hours of sound sleep. He was feeling fully fit with no history of any alcohol or medicine intake. The BA test conducted in the evening i.e. prior to the first flight of the day was negative. The flight (Delhi-Kolkata sector) was uneventful in which the First officer did supervised landing. The flight for sector Kolkata- Hyderabad took off at 2135 hrs IST and after about 30 – 35 minutes into flight, the first officer felt throat irritation after having water and had an episode of unconsciousness. He underwent extensive neurological and cardiology investigations. The reports were normal. The probable causes of subject incapacitation during flight could be:

a) Seizure
b) An episode of syncope

The Committee deliberated on following evidences/ circumstances

a) Though there was no classical aura, but the first officer had throat irritation just prior to tonic phase of seizure.
b) The first officer had tonic clonic seizure (Stiffening of hands and feet, eyes open and fixed with shaking movement of body) and bleeding from the side of the mouth (? tongue bite). The episode lasted for approximately 10 minutes.
c) The seizure was followed by post ictal phase of confusion.
d) The first officer was physically fit, had adequate and sound sleep, had his meals (breakfast & lunch), had flown only one sector (Delhi-Kolkata) and was in a sitting posture prior to the episode.

The above evidences are in favor of diagnosis of seizure.

3.0 Conclusions

3.1 Findings

1. Both the pilots were appropriately licensed and qualified to operate the flight.
2. The first officer did supervised landing at Kolkata while operating flight for the sector Delhi-Kolkata. He did not face any problem while operating the Delhi-Kolkata sector.
3. After approximately 30 – 35 minutes into the flight while operating next sector i.e. Kolkata- Hyderabad the first officer, while taking water felt irritation in the throat. Thereafter he went in to unconsciousness.
4. PIC tried to revive him verbally and by touching him, but the First Officer was unresponsive.
5. Lead Cabin attendant and L2 cabin attendant also tried to revive him but found him unresponsive. They reclined his seat and fastened his harness to ensure he doesn't touch his controls inadvertently.
6. Oxygen was administered to First officer through Quick Donning Mask (QDM).
7. Captain declared Emergency as per the procedure and decided to divert to Bhubaneswar. Bhubaneswar tower was informed regarding the nature of emergency and Doctor was also requested to be arranged on arrival.
8. The First officer probably had an episode of seizure, his hand and feet became stiff, his body was shaking, eyes were open & fixed and he was unresponsive to verbal and physical stimuli. Blood stains (?Tongue Bite) from the side of the mouth were also observed.
9. The first officer regained consciousness approx. 10 minutes after the symptoms began and he further took 10 minutes to orient himself to what was happening. First officer continued to breathe oxygen through QDM inside the cockpit after he recovered.
10. During the episode his pulse rate was 90 – 100 per minute, BP was not checked and he was administered oxygen by putting QDM selected on emergency mode.

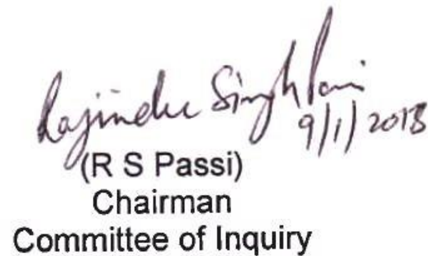
11. Captain carried out a stabilized ILS approach in Bhubaneswar. Aircraft landed safely and was taxied to bay.
12. The first officer was examined by a doctor in cockpit and was taken out of the aircraft in a wheelchair.
13. At the airport he was examined by airport doctor, who gave symptomatic treatment and provisionally diagnosed him as a case of hypertension, haemetemesis. He was advised clinical investigations for further evaluation.
14. Thereafter the first officer was taken to Apollo Hospital, Bhubaneswar, he was administered IV fluids and was diagnosed as a case of ? Seizure.
15. He was referred to Department of Neurology for further evaluation and management. He was evaluated by a Neurologist at a Private hospital in Noida. During evaluation, EEG was normal, CEMRI brain was normal. Incidentally he was detected having Vitamin B12 and Vitamin D deficiency. Ultrasound (abdomen and pelvis) showed cholelithiasis and sludge and cystitis with significant post void residue.
16. The first officer underwent optical urethrotomy on 02.09.2017 and laparoscopic cholecystectomy on 11.10.2017.
17. Further he was evaluated at AFCME, New Delhi. After evaluation he was recommended temporary unfit for 04 weeks on account of loss of consciousness under investigation, cholelithiasis operated, Stricture urethra operated and vitamin B12 and vitamin D deficiency.
18. He was advised review with opinion of neurologist, cardiologist, urologist and GI surgeon along with 2D ECHO, TMT and holter reports.
19. The occurrence could not have been predicted earlier given his fitness.

3.2 Probable cause of the Incident

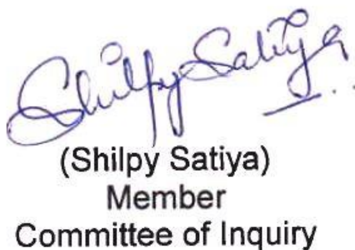
The pilot incapacitation during flight was most probably caused due an episode of seizure.

4.0 Recommendations

- The cabin crew must be fully trained and confident in handling a case of seizure. The following points need to be kept in mind.
    - ➢ Must check & record pulse, temperature, Blood Pressure and respiratory rate of the involved flight crew.
    - ➢ In case the individual is having seizure, after convulsion cease, turn individual to semi prone position, ensure that airway is clear.
    - ➢ To prevent tongue biting a padded gag or tightly rolled handkerchief may be inserted between the teeth.
    - ➢ In case the QDM is used for administrating oxygen to the incapacitated flight crew, the cabin crew must ensure that the Airway (mouth, nose & throat) is patent.



(R S Passi)
Chairman
Committee of Inquiry



(Shilpy Satiya)
Member
Committee of Inquiry

(Gp. Capt. (Dr.) Rajesh Kumar)
Member
Committee of Inquiry

Date: 09.01.2018
Place: New Delhi