

民航意外調查機構

AAIA

Air Accident Investigation Authority



Crew Incapacitation

Investigation Report

Incident

Airbus A350-941

B-LRR

Enroute from Perth to Hong Kong

21 February 2019

08-2023

AAIA Investigations

Pursuant to Annex 13 to the Convention on International Civil Aviation and the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Cap. 448B), the sole objective of the investigation and the Investigation Report is the prevention of accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

The Chief Inspector ordered an inspector's investigation into the event as a serious incident in accordance with the provisions in Cap. 448B.

Based on all collected evidence and the subsequent analysis, the event has been reclassified as an incident in accordance with the latest International Civil Aviation Organization (ICAO) guidance on occurrence classification.

This Incident Investigation Report contains information of an occurrence involving an Airbus A350 aircraft, registration B-LRR, operated by Cathay Pacific Airways Limited, which occurred on 21 February 2019.

The Bureau of Enquiry and Analysis for Civil Aviation Safety (BEA) of France, being the investigation authority representing the State of Design and the State of Manufacture, the Civil Aviation Department (CAD), and the operator provided assistance to the investigation.

Unless otherwise indicated, recommendations in this report are addressed to the regulatory authorities of the State or Administration having responsibility for the matters with which the recommendation is concerned. It is for those authorities to decide what action is taken.

This Investigation Report supersedes the Preliminary Report and all previous Interim Statements concerning this incident investigation.

All times in this Investigation Report are in Hong Kong Local Times unless otherwise stated.

Hong Kong Local Time is Coordinated Universal Time (UTC) + 8 hours.

Chief Accident and Safety Investigator
Air Accident Investigation Authority
Transport and Logistics Bureau
Hong Kong
May 2023

Aircraft Type and Registration:	Airbus A350-941
No & Type of Engines	2 Rolls-Royce Trent XWB-84 turbofan engines
Year of Manufacture	2017 (Serial no. 0119)
Date & Time	21 February 2019 at 0600 hrs
Location	Latitude: 14° 1' 6" N, Longitude: 116° 53' 40" E
Type of Flight	Commercial Air Transport (Passenger)
Persons on Board	Crew – 13 Passengers – 270
Injuries	Crew – None Passengers - None
Commander's Licence	Airline Transport Pilot's Licence
Commander's Age	59 years
Commander's Flying Experience	20,188:42 hours (of which 94:02 hours were on type) Last 90 days - 94:02 hours Last 7 days - 13:33 hours Last 24 hours – 13:23 hours
Commander's Medical Certificate	Valid till 31 March 2019
First Officer's Licence	Airline Transport Pilot's Licence
First Officer's Age	46 years
First Officer's Flying Experience	7,607:32 hours (of which 243:08 hours were on type) Last 90 days - 147:31 hours Last 7 days – 05:55 hours Last 24 hours – 05:55 hours
First Officer's Medical Certificate	Valid till 31 July 2019

Synopsis

On 21 February 2019, a Cathay Pacific Airways Airbus A350-941 aircraft, registration B-LRR, was operating from Perth International Airport (YPPH), Australia, to Hong Kong International Airport (VHHH), as scheduled passenger flight CPA170.

The Captain experienced breathing difficulties and lost his visual acuity one and a half hours before landing. Subsequently, a PAN-PAN was declared to the Hong Kong Air Traffic Control (ATC). Single pilot operation was carried out by the First Officer for approach and landing. The aircraft landed safely at about 0716 hrs and taxied to bay S35 without further incident. On arrival, the Captain was assisted by paramedics. There was no damage to the aircraft and no injury to persons.

In view of the analysis on the operation of this flight and the operator's Standard Operating Procedures for and training in crew incapacitation, no safety recommendation is proposed.

1. FACTUAL INFORMATION

1.1. History of the Flight

- (1) At 0019 hrs on 21 February 2019, a Cathay Pacific Airways Airbus A350-941 (A350) aircraft, registration B-LRR, was operating a scheduled passenger flight CPA 170 from Perth International Airport (YPPH), Australia, to Hong Kong International Airport (VHHH). It was an Extended Diversion Time Operations (EDTO) sector. Two flight crew were on board the aircraft. The First Officer (FO) was the Pilot Flying (PF) and the Captain (CN) was acting as Pilot Monitoring (PM).
- (2) As the aircraft approached Hong Kong near Manila at about 0600 hrs local time, approximately 974 km south of Hong Kong, the CN informed the FO that he was experiencing breathing difficulties and had lost his visual acuity. The CN then declared he was incapacitated. The FO then assumed control of the aircraft.
- (3) The CN remained in position but voluntarily securing the seat harness restraints to prevent any possible interruption with the operation of the aircraft; the CN's seat was moved to the fully aft position with the shoulder harnesses locked.
- (4) The crew sought medical assistance from a medical doctor passenger and the medical advice of the emergency company doctor on ground through the cockpit SATCOM¹ system. The condition of the CN became stable with the supply of medical oxygen and medication. The CN remained conscious and in communication with the FO throughout the occurrence.
- (5) After discussion with the CN the FO decided not to divert the flight to Manila airport but to continue to Hong Kong. The reasoning was that the aircraft was approaching the equal time point (ETP²) between VHHH and Manila and the FO considered that it would be a lower risk for him to land at VHHH.
- (6) After the flight entered the Hong Kong Flight Information Region (FIR), the FO made a PAN-PAN³ call to the Hong Kong Air Navigation Service Provider (ANSP)⁴ requesting a lower flight level to decrease the cabin

¹ Airborne radio telephone communication via a satellite is abbreviated to the term SATCOM.

² The Equal Time Point (ETP) is the track position, in relation to two suitable airports, from which it is the same time for an aircraft to fly to either.

³ A PAN-PAN call is the ICAO standard phraseology used as a preface to a radio transmission to indicate a state of urgency requiring priority, but for the time being, it does not pose an immediate danger to life or to the aircraft itself.

⁴ The Air Traffic Management Division of the Civil Aviation Department (CAD) is the ANSP in Hong Kong responsible for the provision of air traffic service (ATS) to aircraft operating within the Hong Kong FIR, which include the alerting service regarding aircraft in need of search and rescue, and the coordination of search and rescue mission.

altitude in order to help the CN to breathe easier. ATC provided a shortened track for the flight to land on Runway 07R of VHHH.

- (7) From the top of descent up to landing the Senior Purser (SP) was assigned to assist the FO in the flight deck in accordance with the operator's A350-941 Quick Reference Handbook (QRH) for Crew Incapacitation. The doctor passenger took care of the CN inside the cockpit.
- (8) The aircraft landed safely at about 0716 hrs and taxied to bay S35 without further incident. On arrival, the CN was taken to a hospital for medical supervision.
- (9) The aircraft was undamaged, and no one was injured in this occurrence.

1.2. Injuries to Persons

Nil.

1.3. Damage – Aircraft

Nil.

1.4. Personnel Information

Both the CN and the FO held a valid Airline Transport Pilot's Licence (ATPL).

1.5. Aircraft Information

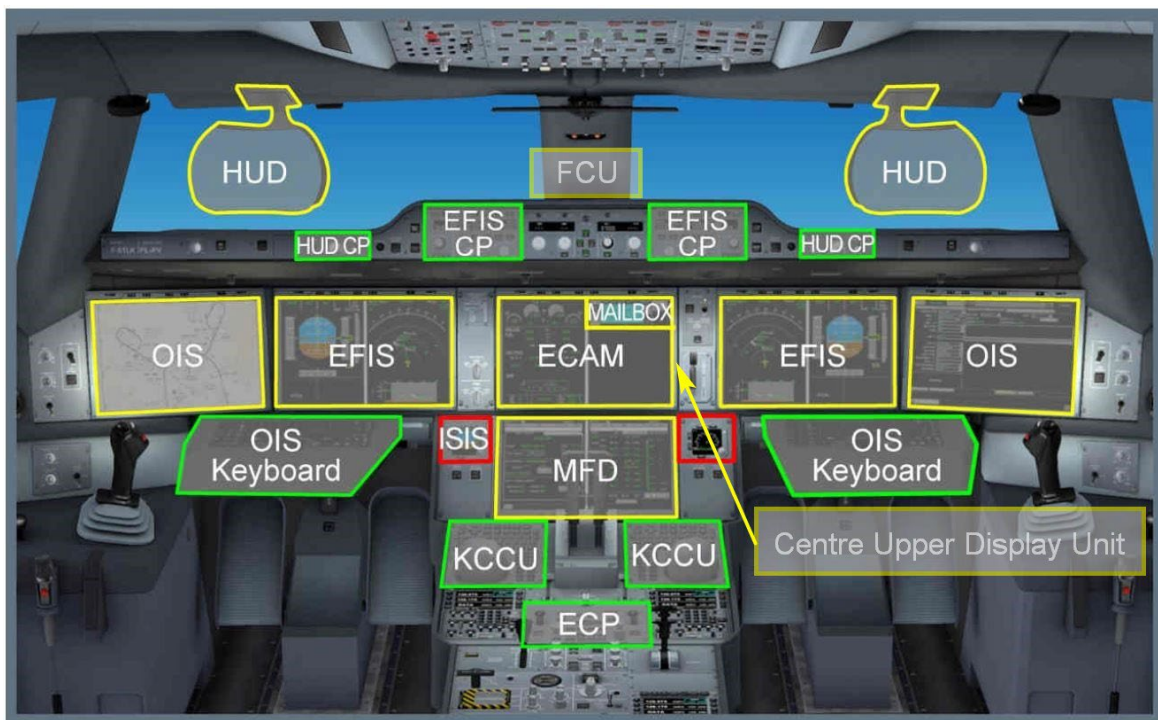
- (1) The Airbus A350 is a subsonic, medium to long range aircraft designed for commercial transportation of passengers and cargo. It has a two-crew glass cockpit and is powered by two Rolls-Royce Trent XWB-84 high bypass turbofan engines.
- (2) The aircraft was operated by Cathay Pacific Airways and had a valid Certificate of Airworthiness (C of A) in Transport Passenger category and a valid Certificate of Registration (C of R).
- (3) The aircraft was equipped with VHF radio communication systems. All VHF radios were serviceable. All communications between Hong Kong ATC and the crew were recorded by Voice Recording System in the ATC System.
- (4) The Control and Display System (CDS) provides the flight crew with the information necessary to operate the aircraft safely and accurately. The CDS has 6 identical and interchangeable Display Units (DUs). The CDS enables the flight crew to:

- (a) Fly and navigate the aircraft, via:
 - Electronic Flight Instrument System (EFIS)
 - Head Up Display (HUD)
 - Multifunction Display (MFD)
 - Integrated Standby Instrument System (ISIS)
 - Radio Management Panel (RMP)

- (b) Communicate, via:
 - The Radio Management Panel, for voice and datalink communication
 - The MFD and the Mailbox, for datalink communication

- (c) Manage the aircraft systems, via:
 - The Electronic Centralized Aircraft Monitoring (ECAM)

- (d) Manage the mission, via:
 - The MFD
 - The Onboard Information System (OIS).



ECP - ECAM Control Panel; FCU - Flight Control Unit; KCCU - Keyboard and Cursor Control Unit

Figure 1: Overview of Control and Display System

- (5) The crew can manually activate some emergency and abnormal procedures that the systems do not sense. On the ECAM Control Panel (ECP), the crew can manually push the ABN PROC⁵ pushbutton to go to the supplementary abnormal procedures menu-page. This menu has different sub-menus, to get and activate different abnormal procedures.

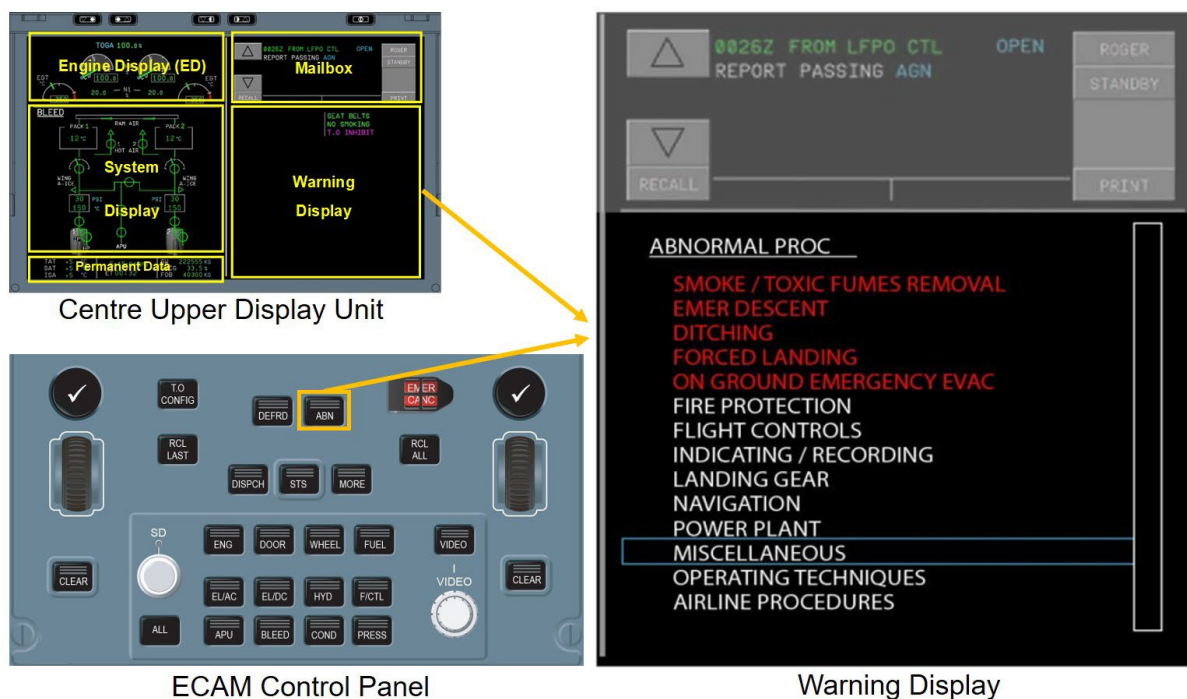


Figure 2: Display of Abnormal Procedures

- (6) The engine thrust can be controlled either manually or automatically. The autothrust (A/THR) functions are hosted in the three primary computers (PRIM). They communicate with the flight control unit (FCU), the engines and the CDS. In automatic mode, the thrust orders are sent automatically by the A/THR function part of the Automatic Flight System (AFS) to the Propulsion Control System (PCS).

1.6. Meteorological Factors

There was no significant weather enroute and at Hong Kong International Airport when the CN had breathing difficulties and lost his visual acuity. The weather conditions are not considered a factor in this incident.

1.7. Medical and Pathological Information

- (1) Both the CN and the FO were compliant with the medical requirements to hold an ATPL.

⁵ Abnormal Procedures

- (2) The CN had sufficient rest before conducting the flight.
- (3) After conducting a walkaround check in Perth, the CN felt out of breath but recovered after a short period of time. After about an hour enroute, the CN felt shortness of breath again. He then used an oxygen mask to breathe 100% oxygen for 10 to 20 seconds and felt better. He later put on the oxygen mask again.
- (4) Both the CN and FO conducted periods of inflight rest.
- (5) At approximately 0530 hrs and around 20 minutes from the ETP between Manila and Hong Kong and in the Manila FIR, the CN started to feel worse again. He experienced difficulty in breathing, loss of vision acuity, dizziness, headache, and chest pain. He told the FO that "I am not feeling good and getting worse. I am incapacitated." The FO then called the Inflight Service Manager (ISM) to the cockpit for assistance.
- (6) After the ISM entered the cockpit, the CN was well enough to tell her his condition. He later declared incapacitation and handed over the control to the FO.
- (7) The FO contacted MedLink of the Aviation Medical Office (AMO)⁶ and they advised the CN to use oxygen and have sugary drinks.
- (8) The SP in the cabin made a PA⁷ call to ask if there were any doctors on board. A medical doctor passenger came forward and offered help in the cockpit. After communication between the doctor passenger and MedLink, the CN was given several different medicines. The doctor passenger remained in the cockpit for landing to monitor the CN's condition.
- (9) The CN took the medication and felt better. He remained conscious for the remaining flight. According to the FO, the CN was not fully incapacitated and "could speak about 60 to 70%".
- (10) The CN had no medical history regarding this symptom.
- (11) After the event the CN was temporarily removed from duties until he could obtain medical clearance to resume flying.

⁶ When a medical situation arises during a flight, crewmembers have ready access to an emergency department doctor for advice and assistance.

⁷ Passenger Address

1.8. Organisation, Management, System Safety

1.8.1. Operations Procedures for Pilot Incapacitation

1.8.1.1. Procedures for Flight Crew

The procedures, policy, and guidance for flight crew regarding pilot incapacitation are described in the Airbus Flight Crew Techniques Manual (FCTM), the QRH, the operator's Operations Manual Part A (OM Part A), and the procedures for cabin crew. The relevant contents are as follows.

1.8.1.1.1. Airbus A350 Flight Crew Techniques Manual

The FCTM provides general information on crew action upon confirming pilot incapacitation:

“The recovery from a detected incapacitation of the fit pilot shall follow the sequence below:

FIRST PHASE

- *Take over and ensure a safe flight path: Announce “I have control”, and if necessary, press the sidestick priority take-over pushbutton. Engage the onside autopilot as required.*
- *Declare an emergency to ATC.*
- *Take whatever steps are possible to ensure the incapacitated pilot cannot interfere with the handling of the aircraft. This may include involving cabin crew to secure the incapacitated pilot.*
- *Request assistance from any medically qualified passenger.*
- *Check if a type qualified company pilot is on board to replace the incapacitated crew member.*
- *Land at the Nearest Suitable Airport after considering all pertinent factors.*
- *Arrange medical assistance after landing giving many details about the condition of the affected crewmember.*

SECOND PHASE

- *Prepare the approach and read the checklist earlier than usual. Depending on the situation, consider automatic landing in order to reduce workload.*

- Request radar vectoring and prefer a long approach to reduce workload.
- Perform the landing from the fit pilot usual place.”

1.8.1.1.2. Quick Reference Handbook

The Abnormal and Emergency Procedures in the QRH for pilot incapacitation are as below.


 350-941 QUICK REFERENCE HANDBOOK	ABNORMAL AND EMERGENCY PROCEDURES	2.04A 12 SEP 18
CREW INCAPACITATION		
<p><u>PILOT NOT INCAPACITATED</u></p> <ul style="list-style-type: none"> • Fly the aircraft. Use the side-stick take over Pb if considered necessary. (Other side-stick is latched off after 40 SEC) • Confirm incapacitation. • Make optimum use of the autopilot. • Declare an emergency to ATC. • Call the ISM or available crew member to the cockpit. <p>The best way to request assistance from the Cabin Crew is by PA: eg. “Attention; ISM to the flight deck, attention; ISM to the flight deck”. The ISM or any other C/A must proceed immediately to the cockpit.</p> <p><u>CABIN CREW/AVAILABLE CREW MEMBER</u></p> <ul style="list-style-type: none"> • Tighten and manually lock the shoulder harness of the incapacitated crew member. The shoulder harness can be locked by use of the locking lever on the inboard rear face of the seat. • Move the seat completely aft and fully recline it. The seat can be moved and reclined using the levers on the inboard side of the seat pad. • Fit oxygen mask. If the pilot is breathing, fit the pilot’s oxygen mask (100 % and emergency setting). If breathing stops, use resuscitation equipment. • Remove the incapacitated pilot, if possible, unless he is convulsive. It takes 2 people to remove the dead weight of an unconscious body from a seat without endangering any controls and switches. If it is not possible to remove the body, one cabin attendant or crew member is to remain in the cockpit to take care of and observe the incapacitated crew member. • In co-ordination with the ISM, request assistance from any medically qualified passenger. • Check if a type qualified company pilot is on board to replace the incapacitated crew member. If only a Cabin Crew member is available, he/she will occupy the 3rd occupant’s seat and assist the pilot as instructed. The primary task will be to read checklists as required by the pilot. 		

Figure 3: Abnormal and Emergency Procedures for Pilot Incapacitation

1.8.1.1.3. Operations Manual Part A

The relevant information is extracted as follows.

- (1) If the Commander/Pilot in Charge (PIC) becomes incapacitated, the FO will assume the command of the aircraft.
- (2) In the event of injury or illness occurring to any crew member in flight, the crew should assess whether to land at the nearest suitable airport where adequate medical facilities are available.
- (3) The crew shall seek advice from the AMO, Senior Medical Officer (SMO) or Duty Medical Officer (DMO) via SATCOM or if unavailable via ACARS⁸ requesting an urgent response. If direct contact with the SMO/DMO is not available, the crew should seek advice from MedLink.
- (4) If crew incapacitation leads to the number of effective crew members (flight and cabin Crew) falling below the minimum specified in the Operations Manual, an emergency shall be declared to ATC.
- (5) In the case of pilot incapacitation on an EDTO sector, the senior pilot in charge should, when deciding whether to continue the flight or land enroute, take into account the following factors:
 - (a) the seriousness of the illness or injury;
 - (b) the reduction in flight time;
 - (c) weather and approach aids at the destination and suitable enroute alternate airports;
 - (d) familiarity with suitable enroute alternate airports; and
 - (e) the extra workload involved in diverting single-handedly, even with assistance from other Crew members (e.g. Cabin Crew or positioning Flight Crew).
- (6) Once a flight crew member has become incapacitated, under no circumstances should that person resume duties until cleared by the SMO/DMO.
- (7) In case of incapacitation of the Commander/PIC, the pilot assuming command is to operate from their normal control seat if possible. Aircraft docking may only be accomplished by a pilot seated in their normal

⁸ Aircraft Communication Addressing and Reporting System (ACARS) is a digital data link system for the transmission of messages between aircraft and ground stations.

operating seat either using a guidance system calibrated for that seat or a ground marshaller. The aircraft shall be towed onto the bay if this is not possible.

1.8.1.1.4. Procedures for Cabin Crew

The relevant procedures of pilot incapacitation include the following steps.

- (1) Pull pilot back into seat.
- (2) Restrain pilot using shoulder harness.
- (3) Lock shoulder harness.
- (4) Position seat fully aft.
- (5) Recline seat back fully.
- (6) Fit the oxygen mask (100% setting and emergency setting) or use resuscitation equipment.
- (7) Remove pilot, unless he is convulsive.
- (8) Carry out cockpit duties as instructed.

1.8.2. Crew Training and Checking for Pilot Incapacitation

1.8.2.1. Training and Checking for Flight Crew

- (1) When a flight simulator is used for proficiency training and checking, the opportunity is taken to use Line-Oriented Flight Training (LOFT)⁹ with emphasis on Crew Resource Management (CRM) where possible.
- (2) LOFT is utilised in the recurrent training programme and the flight crew has to complete elements of CRM training.
- (3) Pilot incapacitation is an annual item in the proficiency checks the flight crew are subject to.

⁹ LOFT is the training in a simulator with a complete crew using representative flight segments which contain normal, abnormal, and emergency procedures that may be expected in line operations.

1.8.2.2. Training for Cabin Crew

- (1) The operator’s cabin crew training is conducted in the cabin-training centre, with an emphasis on a competency-based approach to performance assessment.
- (2) The cockpit trainer is a fixed base dual type (Airbus/Boeing) mock up with representative seats and harness for the respective types. The mock up does not have electronic checklists presented in the pilot’s displays.
- (3) Senior cabin crew members are trained to perform checklist reading using a printed QRH stowed in the cockpit.
- (4) The pilot position for the incapacitation exercise is assumed by one of the trainees.
- (5) Senior cabin crew members are arranged to participate in flight simulator LOFT exercises.

1.9. Additional Information

1.9.1. Pilot Incapacitation

- (1) According to ICAO Doc 8984 *Manual of Civil Aviation Medicine*¹⁰, inflight “incapacitation” means any reduction in medical fitness to a degree or of a nature that is likely to jeopardize flight safety. The document divides incapacitations into two operational classifications: “obvious” and “subtle”.
- (2) *“Obvious incapacitations are those immediately apparent to the other crew members. The time course of onset can be “sudden” or “insidious” and complete loss of function can occur.”*
- (3) *“Subtle incapacitations are frequently partial in nature and can be insidious because the affected pilot may look well and continue to operate but at a less than optimum level of performance. The pilot may not be aware of the problem or capable of rationally evaluating it. Subtle incapacitations can create significant operational problems.”*

1.9.2. Crew Resource Management

- (1) CRM is the effective utilisation of the vast array of resources available to flight crew to assure a safe and efficient operation, reducing and managing error, avoiding stress and increasing efficiency. The resources may include other flight crew members, cabin crew, procedures, machine

¹⁰ Third Edition - 2012

interface in the aircraft, ATC, support from airline maintenance and operations centres, etc.

- (2) CRM is considered essential training of the cognitive and social skills needed to support technical knowledge and skills training in order to optimise safe and efficient aircraft operation for crew members.

1.9.3. Line-Oriented Flight Training

- (1) LOFT is a practical application of CRM concepts. It is carried out in a flight simulator as part of initial or recurrent flight crew training. It involves simulated scenarios of routine daily airline operations with reasonable and realistic difficulties and emergencies introduced to provide training and evaluation of proper flight deck management techniques.
- (2) The abnormalities, which will be encountered, are generally not pre-briefed.
- (3) Special emphasis is laid on situations which involve communications, management and leadership.
- (4) LOFT is not used as a method of checking the performance of individuals. Instead, it is a validation of training programmes and verification of operational procedures.

1.9.4. Event Classification

- (1) According to Attachment C of ICAO Annex 13 *Aircraft Accident and Incident Investigation* in the Eleventh Edition at the time of the occurrence, flight crew incapacitation in flight is a typical example of serious incident. In the Twelfth Edition published in July 2020, this example was expanded as follows:

“Flight crew incapacitation in flight:

- a) *for single pilot operations (including remote pilot); or*
- b) *for multi-pilot operations for which flight safety was compromised because of a significant increase in workload for the remaining crew.”*

- (2) In addition, the revised Attachment C introduced an event risk-based analysis which can be performed as follows:

“a) consider whether there is a credible scenario by which this incident could have escalated to an accident; and

b) *assess the remaining defences between the incident and the potential accident as:*

- *effective, if several defences remained and needed to coincidentally fail; or*
- *limited, if few or no defences remained, or when the accident was only avoided due to providence.”*

(3) Based on the new guidance, risk assessment on occurrence can be performed in a systematic, robust, and intellectually cohesive manner to determine whether it should be classified as a serious incident.

2. Safety Analysis

2.1. Flight Operations

(1) After the CN's condition deteriorated again, he declared incapacitation and handed over the control to the FO. The FO took out the Crew Incapacitation checklist in the QRH and ran through it. The FO called the operator's Integrated Operations Centre (IOC), advised them of the situation, and asked for medical support on arrival. The FO had an early opportunity to maintain control of the aircraft, take care of the CN, re-organise the flight deck work, and land the aircraft.

(2) When the CN declared he was incapacitated, the FO was the PF and the autopilot system was kept engaged. There was no immediate threat to the control of the aircraft. Optimal use of the autopilot is mandated by airlines as SOPs and is also one of the steps in Pilot Incapacitation checklist in the Abnormal and Emergency Procedures. The autopilot system could also autoland the aircraft if required.

(3) At this point the aircraft was closer to Manila than Hong Kong by around 20 minutes. The CN remained conscious and was able to talk to the FO. After discussion and consideration of the CN's medical situation, flight phase, aircraft conditions, meteorological conditions, time taken for negotiating a re-clearance with Manila ATC versus expected timely response from and priority given by ATC at the home port, single pilot operation, etc., the FO's assessment of the contingency options and the decision to continue to the familiar home port is considered appropriate.

(4) The FO used the electronic checklists as per the SOP with the SP available to read out the printed checklist if required, as he considered that the

electronic checklists were easier to access, search and follow. By having checklists available at the touch of a button, crewmembers, when faced with unexpected situations, have the proper checklists for emergency procedures available.

- (5) ATC prioritised the approach of the flight and instructed them to descend for a high speed approach to Hong Kong. ATC also cleared the aircraft to descend early for a lower cabin altitude which might help the CN to breathe. The communication of the flight with the enroute and terminal ATC units was effective.
- (6) There was no evidence indicating that the FO had any difficulty in dealing with the situation and continuation of the flight. Adhering to the SOP and making the best use of the assistance and resources from ATC, cabin crew, and aircraft automation reduced the complexity and workload for the FO.
- (7) The FO used the appropriate level of automation and decided to conduct a manual landing with autothrust over an autoland as it was the most familiar to him. The aircraft was landed safely and taxied to the arrival gate with no further events.
- (8) The flight crew and cabin crew complied with the operational aspects of company procedures, policy, and guidance during the descent, approach, and landing.

2.2. Training

- (1) It should be noted that both pilots are trained and have to pass the proficiency checks to the same standard, one of whom is nominated by the company as a CN and the other as an FO. In addition, incapacitation training is carried out in the company simulator recurrent training package approved by the CAD and cabin crew also attend refresher courses annually and a practical refresher every three years.
- (2) According to the statement of the CN, although the workload for the FO increased significantly, the FO executed the Non-Normal Checklist literally and it was apparent that the FO's previous training was very useful as his stress level was well controlled.
- (3) Pilot incapacitation is an annual item in the proficiency check. In addition, during the operators' LOFT training in the simulator, pilot incapacitation may be simulated at any phase of the flight. It is considered that the FO was trained adequately to manage cases of pilot incapacitation.

2.3. AAIA Observations

- (1) Overall the event, from an operational point, was handled utilizing robust SOP assisted with appropriately applied CRM. Aspects of training, both in the operation of the aircraft and in which the CN declared that he was incapacitated and did not interfere in further duties, all combined to produce a successful outcome.
- (2) Checklists, whether printed or electronic, constitute tools that support flight crew airmanship and memory and ensure that all required actions are performed without omission and in an orderly manner. The completion of checklists provides a defence against errors of omission in normal and abnormal circumstances and assist the flight crew in the application of SOP to ensure safe and proper operation of the aircraft.

2.4. Reclassification of the Event

- (1) According to the above analysis, AAIA considers that the flight safety of this event was not compromised because of a significant increase in workload for the remaining crew.
- (2) In addition, the SOP, training of flight crew, ATC, cabin crew, and aircraft automation were defences in place which effectively stopped further escalation of the event into a serious incident or accident.
- (3) Therefore, according to the additional description of “flight crew incapacitation in flight” and the new guidance on event risk-based analysis in the revised Attachment C of ICAO Annex 13, the event was reclassified as Incident.

3. Conclusions

3.1. Findings

- (1) As the aircraft approached Hong Kong near Manila at about 0600 hrs local time, approximately 974 km south of Hong Kong, the Captain informed the First Officer that he experienced breathing difficulties and lost his visual acuity. [1.1 (2)]
- (2) From the top of descent up to landing the Senior Purser was assigned to assist the First Officer in the flight deck in accordance with the operator’s A350 941 Quick Reference Handbook (QRH) for Crew Incapacitation. [1.1 (7)]

- (3) The crew were licensed and qualified for the flight in accordance with existing regulations and the operator's requirements. [1.4, 1.7 (1)]
- (4) The aircraft had a valid Certificate of Airworthiness and a valid Certificate of Registration in accordance with the regulations. [1.5 (2)]
- (5) The weather conditions are not considered a factor in this incident. (1.6)
- (6) The Captain had sufficient rest before conducting this flight. [1.7 (2)]
- (7) The Captain experienced difficulty in breathing, loss of vision acuity, dizziness, headache, and chest pain. [1.7 (5)]
- (8) The operator has procedures, policy, guidance, and training for flight crew and cabin crew regarding pilot incapacitation. (1.8.1, 1.8.2)
- (9) The Captain's incapacitation was self-evident and he advised the First Officer in a timely manner. This allowed the First Officer and the cabin crew to take appropriate actions promptly. [2.1 (1)]
- (10) The First Officer made optimal use of the autopilot system to control the aircraft. [2.1 (2)]
- (11) The First Officer's assessment of the contingency options and the decision to continue to home port is considered appropriate. [2.1 (3)]
- (12) The First Officer used the electronic checklists as per the SOP with the Senior Purser available to read out the printed checklist if required. [2.1 (4)]
- (13) The best use of the assistance and resources from ATC, cabin crew, and aircraft automation reduced the complexity and workload for the First Officer. [2.1 (6)]
- (14) The flight crew and cabin crew complied with the operational aspects of company procedures, policy, and guidance during the descent, approach, and landing. [2.1 (8)]

3.2. Cause

The Captain experienced difficulty in breathing, loss of visual acuity, dizziness, headache, and chest pain and the situation continued to deteriorate. [3.1 (7)]

4. Safety Recommendations

In view of the above analysis on the operation of this flight and the operator's SOP for and training in crew incapacitation, no safety recommendation is proposed.