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Air Accident Investigation Authority

Multiple Hydraulic System Failure (SCF-NP-MISC-HYDFL)

**Serious Incident Investigation
Preliminary Report and
Public Notice**

**Boeing 747-400F, N406KZ,
Hong Kong International Airport
17 June 2024**

PLR-2024-01

1. Purpose

- (1) This preliminary report provides factual information established in the investigation's early evidence collection phase. Its purpose is to provide timely information to both the aviation industry and the general public.
- (2) This report is released in accordance with the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Cap. 448B) and the requirements of Annex 13 to the Convention on International Civil Aviation – Aircraft Accident and Incident Investigation (ICAO Annex 13).
- (3) The Air Accident Investigation Authority (AAIA)'s understanding of the serious incident will be enhanced as the investigation progresses and potential new evidence becomes available. As such, no analysis or findings are included in this report.
- (4) Should safety recommendations be considered necessary during the course of the investigation, they will be promulgated to the parties concerned immediately before the final Investigation Report is published.
- (5) The Investigation Report will be released at the conclusion of the investigation, which will provide a comprehensive overview of this serious incident, its causes, and any recommendations to improve air safety.

2. General Details

2.1 Occurrence details

Date and time (see Note):	17 June 2024, between 0409 hours and 0712 hours
Occurrence category:	Serious Incident
Primary occurrence type:	Multiple Hydraulic System Failure (SCF-NP-MISC-HYDFL)
Location:	Hong Kong International Airport (VHHH)
Position:	Latitude N22.322091, Longitude E113.883862

2.2 Pilot in Command details

Licence details:	Federal Aviation Administration (FAA) Airline Transport Pilot (ATP) certificate
Medical certificate:	Class 1
Type ratings:	B747-4, B737, B747, DC-9
Command time on type (B747-400F)	7,483:58 hours

2.3 Aircraft details

Manufacturer and model:	Boeing 747-400F	
Registration:	USA, N406KZ	
Serial number:	36133	
Year of Manufacture:	2007	
Number / type of engines:	Four GE CF6-80C2B1F turbo-fan engines	
Operator:	Atlas Air	
Type of Operation:	Scheduled Public Transport of Cargo	
Departure:	Hong Kong International Airport (VHHH)	
Destination:	Ted Stevens Anchorage International Airport (PANC)	
Persons on board:	Crew – 4	Passengers – 1 Supernumerary crew
Injuries:	Crew – 0	Passengers – 0
Aircraft damage (primary):	#9 and #10 tires/wheels/brakes, lower forward fuselage, lower right wing sections and components/systems including the hydraulic lines of systems #1, #2, and #4 inside the right-hand wing landing gear (RH WLG) wheel well	

Note: All times are local Hong Kong time that is Coordinated Universal Time (UTC) plus eight hours.

3. Synopsis

- (1) On 17 June 2024 at 04:09 am local time, an Atlas Air (ICAO¹ code: GTI / IATA² code: 5Y) Boeing 747-400F freighter, registration mark N406KZ, departed Hong Kong International Airport (VHHH) bound for Ted Stevens Anchorage International Airport (PANC) as flight GTI4304.
- (2) The freighter carried a payload of 108 tons and 123.4 tons of fuel, with a total take-off weight of 393.1 tons. On board GTI4304, there were four crew members on the flight deck and one supernumerary crew positioned in the cabin.
- (3) The aircraft took off from runway 25L at VHHH. During the take-off roll, the crew experienced a slight yawing and shimmy sensation when the aircraft accelerated between 80kts and 100kts. However, in the absence of cockpit indications and other cues that would suggest the aircraft's flyability was compromised, the take-off continued normally with normal gear retraction.
- (4) About 26 minutes into the flight, an [HYD QTY SYS LOW 1] EICAS³ message appeared as the aircraft levelled off from its climb to an initial cruise level of Flight Level 290⁴. After following the appropriate checklist and consulting the Atlas Air's ground office, the pilot in command (PIC) made the operational decision to return to Hong Kong.
- (5) To meet landing weight limits, the crew subsequently initiated fuel jettison after coordinating with the HKG ATC, dumping approximately 80 tons of fuel.
- (6) A PAN-PAN⁵ call was made by GTI4304 during the approach into HKG, advising that the aircraft would require towing off the runway after landing due to the anticipated loss of the nose wheel steering amid the loss of hydraulic #1 system. GTI4304 was cleared for an ILS landing on runway 25R, which took place at 07:12 am local time. The landing was normal with no reported loss of directional control. However, the fluid in hydraulic

¹ ICAO – International Civil Aviation Organization

² IATA – International Air Transport Association

³ An Engine Caution and Crew Alert System (EICAS) is an integrated system to provide flight crew with instrumentation and crew annunciations for aircraft engines and other systems.

⁴ Flight level – A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals. FL290 is equivalent to 29,000 feet above mean sea level when the pressure at sea level is 1013.2 hPa.

⁵ A "Pan-Pan" call is a radio urgency call used in aviation to indicate an urgent situation that is not immediately life threatening. It is used to communicate that the aircraft or its occupants require assistance or have an urgent problem that does not pose an immediate danger to the safety of the aircraft or its passengers. Pan-Pan calls are typically made when there is an urgent situation that requires attention but does not require the full-scale emergency response that would be triggered by a "Mayday" call.

systems #2 and #4 was quickly depleting to zero during the landing roll, accompanied by the corresponding EICAS messages.

- (7) Once the aircraft came to a stop on runway 25R, ATC relayed from the Airport Authority Hong Kong (AAHK) staff on site that there was smoke coming from the wheels. Confirming the brake temperatures were within the normal range and no other hazards were observed, the crew shut down the engines and waited for further assistance from the ground support personnel. Evacuation was not considered necessary.
- (8) Post-flight inspection indicated that #9 and #10 tires were shredded. Parts of #9 and #10 wheels were missing and significant damage was observed on #9 wheel. Several hydraulic lines located in the right-hand wing landing gear (RH WLG) wheel well were found fractured and punctured, and the fluid in hydraulic systems #1, #2 and #4 was completely lost. In addition, some damage was sustained by the lower forward fuselage, lower right wing sections and components/systems inside the wheel well.

4. Instigation of Investigation

- (1) The AAIA received an Aircraft Accident / Incident Reporting Form from the operator after the incident. After validating the collected information, the Chief Inspector (CI) of AAIA classified this occurrence as a Serious Incident, and instigated an investigation into its circumstances, causes and contributing factors, in accordance with Cap. 448B and the requirements of ICAO Annex 13.
- (2) The National Transportation Safety Board (NTSB) of the United States of America, being the investigating authority representing the State of Design, the State of Manufacture of the aircraft, the State of Registry, and the State of the Operator, was notified and has nominated an Accredited Representative to participate in the investigation of AAIA.
- (3) ICAO was also notified of this serious incident.

5. Investigation Progress

- (1) To date, the AAIA has:
 - completed the inspection of the aircraft conditions and secured all relevant photo evidence;
 - downloaded the data from the onboard Digital Flight Data Recorder (DFDR) and Cockpit Voice Recorder (CVR);
 - retrieved the data from the onboard Quick Access Recorder (QAR);
 - conducted 3D image scanning of the affected aircraft sections;
 - interviewed the crew;
 - collected ATC operational records and system footage;
 - retrieved airport's runway foreign object debris (FOD) detection system reports;
 - initiated technical investigation of the relevant aircraft components; and
 - initiated collation of other relevant information from the operator.

- (2) As the investigation progresses, AAIA will:
- analyse the factors that led to the failure of the tires and multiple hydraulic systems;
 - analyse all relevant operational safety risks subsequent to the tire failure and the loss of multiple hydraulic systems;
 - conduct an in-depth examination of the retained aircraft components, with some components to be dispatched to overseas testing facility for detailed examination and testing; and
 - review the operator's procedures and crew actions.
- (3) The detailed analysis of the data and information collected will enable the investigation team to determine the circumstances, causes and contributing factors of this serious incident. It will also aid in identifying areas that need further investigation and/or lines of investigation to be pursued.

6. Public Notice

This Report also serves as a public notice under Regulation 10(1) of Cap. 448B. Any person who wishes to make representation as to the circumstances or causes of the serious incident should do so by letter, facsimile, telephone, or email to the Chief Inspector (Address: Air Accident Investigation Authority, Level G & 2, Facility Building, 1 Tung Fai Road, Hong Kong International Airport, Lantau, Hong Kong; Telephone: (+852) 2910 6079; Facsimile: (+852) 2910 6049 (local), (+852) 3912 4848 (international); or Email: ACCID@tlb.gov.hk within 14 days of this notice.

16 July 2024

K. C. MAN

Chief Inspector

About the Air Accident Investigation Authority

The AAIA is an independent investigation authority under the Transport and Logistics Bureau (TLB) of the Government of the Hong Kong Special Administrative Region of the People's Republic of China.

The AAIA is established in compliance with the Standards and Recommended Practices (SARPs) of ICAO Annex 13 requiring Contracting States to set up an independent investigation authority to ensure the independence and impartiality of the investigations.

The AAIA is responsible for the investigation of civil aircraft accidents and incidents in Hong Kong in accordance with the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Cap. 448B) and the SARPs of ICAO Annex 13.

The sole objective of the investigation shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

Check the AAIA website for information, reports and updates:

<https://www.tlb.gov.hk/aaia/eng/index.html>

The AAIA 24/7 Duty Investigator Hotline:

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