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16 December 2011

Mr. Raymond Lam
Clerk to Panel
Legislative Council Secretariat
Legislative Council Complex
1 Legislative Council Road
Central, Hong Kong

Dear Mr Lam,

Panel on Security

I refer to your letter of 23 November 2011 addressed to the Secretary for Security regarding the helicopter accident of 3 July 2010, which has been referred to us. The requested information is set out in the ensuing paragraphs.

The accident on 3 July 2010 involved an AgustaWestland AW139 helicopter operated by East Asia Airlines. The accident occurred shortly after the helicopter took off from Sheung Wan/Sky Shuttle Heliport, ashore Hong Kong Victoria Harbour. The entire tail rotor assembly became detached from the helicopter whilst climbing at an altitude of approximately 350 feet. The pilot was able to put the helicopter into autorotation and make a controlled ditching in Victoria Harbour. All pilots and passengers were rescued by the nearby vessels and no one was injured.

Since the accident, the Civil Aviation Department (CAD) has issued three reports (enclosed) to advise the public on the details of the accident and the progress of the investigation. They are Accident Bulletin 2/2010 (preliminary report), Interim Statement 2/2011 and Accident Bulletin 4/2011. The investigation is ongoing. In accordance with the requirements stipulated in the Hong Kong Civil Aviation (Investigation of Accidents) Regulations, when the investigation is completed, the draft Final Report will be issued for comments by relevant parties.

Operators of Hong Kong-registered aircraft, including helicopters, must hold an Air Operator's Certificate (AOC) granted by Director-General of Civil Aviation (DGCA) before the aircraft can operate for the purpose of public transport. For the grant of an AOC, DGCA will take into consideration the applicant's previous conduct and experience, his equipment, organisation, staffing, maintenance and other arrangements. The oversight by CAD is a continual task which includes regular audits on the operators, their maintenance contractors and inspection of their operating aircraft. The Government Flying Service is also overseen by CAD under similar requirements.

At the same time, all aircraft registered in Hong Kong are required to obtain a Certificate of Airworthiness in accordance with Articles 7 and 8 of Air Navigation (Hong Kong) Order 1995 in order to fly. To ensure the continued validity of the certificate, the aircraft shall be maintained in accordance with the maintenance schedule approved by CAD. Also, the aircraft shall comply with all the airworthiness directives as required by CAD. These airworthiness directives include those published by the type certification authorities of the aircraft concerned, and contain all the mandatory inspection and modification requirements.

Yours sincerely,


(Miss Monica Chen)

for Secretary for Transport and Housing

c.c. Director-General of Civil Aviation (Attn: Mr YP Tsang)

Chief Inspector of Accidents
Accident Investigation Division
Civil Aviation Department
46th Floor
Queensway Government Offices
66 Queensway
Hong Kong

Accident Bulletin 2/2010

Aircraft Type:	AgustaWestland AW139
Registration:	B-MHJ
Year of Manufacture:	2008
Number and Type of Engines:	Two Pratt & Whitney PT6C-67C turbo-shaft engines
Date and Time of Accident:	3 Jul 2010 at 0400 hours UTC (1200 hours local time)
Place of Accident:	About 370 m north-west of Sheung Wan / Sky Shuttle Heliport, Hong Kong (VHSS)
Nature of Accident:	Shortly after take-off from Sheung Wan / Sky Shuttle Heliport (ashore Victoria Harbour) for Macao, B-MHJ ditched into the harbour north-west of the heliport. All crew and passengers onboard survived and were rescued though some of them suffered from minor injuries.
Type of Flight:	Chartered Public Transport
Persons on Board:	Crew: 2 Passenger: 11
Fatalities:	Nil
Serious Injuries:	Crew: Nil Passenger: Nil
Captain's Licence:	Airline Transport Pilot's Licence (Helicopters)
Captain's Age:	45
Captain's Experience:	6 120 hours (of which 350 hours were on type)
Other Crew:	Cockpit: One First Officer Cabin: Nil
Sources of Information:	Inspector's Investigation

Helicopter Accident - 3 July 2010
AgustaWestland AW139 Registration Mark B-MHJ

(All times are in UTC. Hong Kong time is UTC+8 hours.)

1. East Asia Airlines is a helicopter operator established in Macao, China. It provides chartered passenger service between Macao and Hong Kong. On 3 July 2010, the accident flight EA 206A was operated by two pilots with 11 passengers onboard. The Actual Gross Weight of the helicopter before take-off was 5 971 kg, which was within the Maximum Gross Weight for Take-off / Landing of 6 400 kg for the helicopter. The helicopter was within both longitudinal and lateral centre of gravity limits.
2. The helicopter took off from Sheung Wan / Sky Shuttle Heliport in Hong Kong at 0400 hours. The departure was uneventful. The flight was conducted under Visual Flight Rules, which required the pilot to remain clear of cloud and in visual contact with the surface. At the time of the accident, the wind speed was 7 knots at a direction of 255 degrees. The visibility was more than 10 km.
3. The captain was the 'pilot flying' in the right seat. The first officer was the 'pilot not flying' in the left seat, assisting the captain in carrying out flight procedures. After departing from the heliport, the helicopter was climbing on a north-westerly heading. When passing approximately 350 feet Above Mean Sea Level at about 70 knots Indicated Airspeed, the crew had completed the post-takeoff checks. Shortly afterwards, both pilots heard a loud bang from the rear of the helicopter followed by airframe vibrations. At the same time, the captain found that he had no authority on the pedal controls and determined that the tail rotor of the helicopter had failed. Immediately, the captain put the helicopter into autorotation. Whilst in autorotation, he commanded the first officer to shut down both engines in accordance with the emergency procedures and the first officer carried out the commands accordingly. Also, the captain transmitted a 'MAYDAY' call. The captain made a controlled ditching with the helicopter maintained in level attitudes and low forward speed at touchdown. Once the helicopter touched the water, all the four emergency floats were inflated automatically. The time between the loud bang heard by the pilots and the touchdown on water was about 16 seconds.
4. After the helicopter was floating firmly on water, both pilots exited the cockpit expeditiously through the emergency exits on their respective cockpit doors. The

captain then opened the starboard passenger door from the outside. Both pilots instructed and assisted the passengers to evacuate from the helicopter. After ensuring that nobody was left onboard, the captain left the helicopter. All pilots and passengers were rescued by the nearby vessels. The 11 passengers were taken to hospital for medical examination. Six passengers received treatment for minor injuries. All passengers were discharged from hospital on the same day. The helicopter subsequently overturned and the entire fuselage became submerged but the emergency floats kept the helicopter floating upside down.

5. The Chief Inspector of Accidents has ordered an Inspector's Investigation into the cause of the accident in accordance with the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Laws of Hong Kong, Chapter 448B). The investigation is being conducted by the Hong Kong Civil Aviation Department (CAD) with the assistance from the Civil Aviation Authority of Macao Special Administrative Region, Agenzia Nazionale per la Sicurezza del Volo of Italy, Air Accidents Investigation Branch (AAIB) of the United Kingdom, Transportation Safety Board of Canada and AgustaWestland, the manufacturer of the AW 139 helicopter.
6. In the evening of 3 July 2010, the helicopter was lifted out of water. The top section of the vertical fin, the tail rotor, the tail gearbox and the associated drive shaft, control rods and cover fairings of the helicopter were found missing. After extensive underwater search, the tail rotor and the tail gearbox were salvaged from the harbour on 14 July 2010 but one of the four blades of the tail rotor was still missing. Search of the remaining missing parts is on-going.
7. The accident investigation team conducted interviews with the captain, the first officer, some of the passengers and the command personnel of the Hong Kong Police Force, Fire Services Department and Marine Department who responded to the accident. The data recorded in the Multi-purpose Flight Recorder has been successfully downloaded for analysis. The Health and Usage Monitoring System memory card has been sent to AAIB for data download and analysis. The helicopter flight documents, maintenance records, weather information and radio communication recording with air traffic control have also been collected for investigation purposes. CAD has arranged the tail rotor and the tail gearbox to be sent to AAIB for examination, test and analysis.
8. Based on past experience, the investigation into accident of such scale is expected to take more than one year to complete. However, during the course of the investigation, should safety recommendations be considered necessary, they will be promulgated to the parties concerned before the final report is published.

This Bulletin contains facts relating to the accident as determined up to the time of issue. The information must be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

Chief Inspector of Accidents
Accident Investigation Division
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Queensway Government Offices
66 Queensway
Hong Kong

Interim Statement 2/2011

**Investigation of Helicopter Accident on EA 206A
(AgustaWestland AW139 Registration Mark B-MHJ)
on 3 July 2010**

DATA SUMMARY

Aircraft Type:	AgustaWestland AW139
Registration:	B-MHJ
Year of Manufacture:	2008
Number and Type of Engines:	Two Pratt & Whitney PT6C-67C turbo-shaft engines
Date and Time of Accident:	3 July 2010 at 0400 hours UTC (1200 hours local time)
Place of Accident:	About 370 m north-west of Sheung Wan/ Sky Shuttle Heliport, Hong Kong (VHSS)
Nature of Accident:	Shortly after take-off from Sheung Wan/ Sky Shuttle Heliport (ashore Victoria Harbour) for Macao, B-MHJ ditched into the harbour north-west of the heliport. All crew and passengers onboard survived and were rescued though some of them suffered from minor injuries.
Type of Flight:	Chartered Public Transport
Persons on Board:	Crew: 2 Passenger: 11
Fatalities:	Nil
Serious Injuries:	Crew: Nil Passenger: Nil
Captain's Licence:	Airline Transport Pilot's Licence (Helicopters)
Captain's Age:	45
Captain's Experience:	6,120 hours (of which 350 hours were on type)
Other Crew:	Cockpit: One First Officer Cabin: Nil

All times in this Report are in Coordinated Universal Time (UTC) with Hong Kong Local Time in parenthesis.

1. GENERAL

On 3 July 2010, an AgustaWestland AW139 helicopter, registration B-MHJ, operated by East Asia Airlines¹ and bound for Macao, had an accident shortly after taking off from the Sheung Wan/Sky Shuttle Heliport, ashore Hong Kong Victoria Harbour. The entire tail rotor assembly became detached from the helicopter whilst climbing at an altitude of approximately 350 ft. The pilot was able to put the helicopter into autorotation and make a controlled ditching in Victoria Harbour. All pilots and passengers were rescued by the nearby vessels. The helicopter subsequently overturned and the entire fuselage became submerged but the emergency floats kept the helicopter floating upside down.

In the evening, the wreckage was lifted out of water and positioned to a hangar at the Hong Kong International Airport in the following day. The top section of the vertical tail, the tail rotor, the tail gearbox and the associated drive shaft, control rods and cover fairings of the helicopter were found missing. The tail rotor and tail gearbox were eventually salvaged from the Victoria Harbour on 14 July 2010 but one of the four blades (the White blade) of the tail rotor could not be found. Searching of the White blade and other missing parts mentioned continued until the last attempt made on 3 November 2010 but without success.

The accident investigation was being conducted under the control and direction of the Civil Aviation Department (CAD) with the assistance of the Civil Aviation Authority of Macao Special Administrative Region, Agenzia Nazionale per la Sicurezza del Volo (ANSV) of Italy, Air Accidents Investigation Branch (AAIB) of the United Kingdom, National Transportation Safety Board (NTSB) of the United States of America and AgustaWestland (AW), the helicopter manufacturer.

2. HISTORY OF THE FLIGHT

On 3 July 2010, the accident flight EA 206A was operated by two pilots with 11 passengers onboard. The gross weight of the helicopter before take-off was calculated as 5,971 kg, which was within the Maximum Gross Weight for take-off/landing of 6,400 kg for the helicopter. The helicopter was within

¹ East Asia Airlines is a helicopter operator established in Macao. It provides chartered passenger service between Macao and Hong Kong.

both longitudinal and lateral centre of gravity limits.

The helicopter took off from Sheung Wan/Sky Shuttle Heliport in Hong Kong at 0400 hours (1200 hours). The departure was uneventful. The flight was conducted under Visual Flight Rules, which required the pilot to remain clear of cloud and in visual contact with the surface. At the time of the accident, the wind speed was 7 kts at a direction of 255 degrees. The visibility was more than 10 km.

The captain was the 'pilot flying' in the right seat. The first officer was the 'pilot not flying' in the left seat. After departing from the heliport, the helicopter was climbing on a north-westerly heading. When passing approximately 350 ft at about 70 kts, the crew had completed the post-takeoff checks. Shortly afterwards, both pilots heard a loud bang from the rear of the helicopter and felt airframe vibrations. At the same time, the captain found that he had no authority on the pedal controls and determined that the tail rotor of the helicopter had failed. Immediately, the captain put the helicopter into autorotation. Whilst in autorotation, he commanded the first officer to shut down both engines in accordance with the emergency procedures and the first officer carried out the commands accordingly. Also, the captain transmitted a 'MAYDAY' call. The captain made a controlled ditching with the helicopter maintained in level attitudes and low forward speed at touchdown. Once the helicopter touched the water, all the four emergency floats were inflated automatically. The time between the loud bang heard by the pilots and the touchdown on water was about 16 seconds.

After the helicopter was floating firmly on water, both pilots exited the cockpit expeditiously through the emergency exits on their respective cockpit doors. The captain then opened the starboard passenger door from outside. Both pilots instructed and assisted the passengers to evacuate from the helicopter. After ensuring that nobody was left onboard, the captain left the helicopter. The helicopter remained afloat for approximately 18 minutes before overturning due to the failure of the forward right emergency float. Partial deflation of the forward left emergency float was also noticed.

The 11 passengers were taken to hospital for medical examination. Six passengers received treatment for minor injuries. All passengers were discharged from hospital on the same day.

3. AIRCRAFT INFORMATION

The AgustaWestland AW139 helicopter holds a Type Certificate EASA.R.006 issued by the European Aviation Safety Agency. The helicopter of Serial Number 31222 was delivered following manufacture to the owner and registered in Macao Special Administrative Region on 22 January 2009. The Certificate of Airworthiness of the helicopter was valid and the total aircraft hours recorded was 1467:36 hours.

The helicopter was equipped with two Pratt & Whitney PT6C-67C engines. Engine No. 1 of Serial Number KB0456 and Engine No. 2 of Serial Number KB0452 were installed new on the helicopter. No abnormalities of engine operation were reported prior to the accident.

4. FLIGHT RECORDER AND HUMS

The helicopter was equipped with a Penny & Giles Aerospace Limited Solid State Multi Purpose Flight Recorder, of Model D51615-102, that recorded both flight and cockpit voice data.

The recorder was extracted on helicopter recovery and did not exhibit any impact damage externally.

The readout of the recorder was performed on 5 July 2010. Flight parameters were obtained without any problems and the channels containing the cockpit voice recording were downloaded, thus providing investigators with the flight data and communications for the complete flight and, specifically, at the time of the accident.

The Health and Usage Monitoring System (HUMS) memory card installed on the helicopter was extracted and sent to AAIB for analysis. However, the retrieval of the data from the memory card was unsuccessful due to the corrosion of chips inside the memory card likely caused by sea water ingress.

5. INVESTIGATION

Inspection of the wreckage was performed by both CAD and the helicopter manufacturer. Apart from the damages located at the vertical tail section and the horizontal stabiliser areas, impact damages were also found which included the loss of left-hand nose window transparency panel on the forward fuselage and the break-off of two air scoops from the bottom rear fuselage.

The damage to the vertical tail section appeared to be consistent with the effect of high vibration of tail rotor under power whilst the damages on the horizontal stabiliser could be consequential damages resulted from the departed tail rotor.

Analysis of the flight data revealed that the engines were operating with the required power at the time of accident and ruled out the mechanical failure of any engine component.

The investigation on recovered parts was being carried out with the assistance from the helicopter and component manufacturers, and their respective investigating authorities. The tail rotor assembly and the fractured parts of the vertical tail section were sent for detailed forensic structural inspection and analysis. The report was being awaited.

Two damaged tail rotor blade lag dampers removed from the tail rotor assembly were sent to the manufacturer for investigation. The manufacturer reported that the elastomeric elements on the dampers appeared to be serviceable.

Both forward emergency floats were investigated by the manufacturer. The investigation revealed that with the loss of the tail rotor and the reduced self-buoyancy of the helicopter cockpit due to sea water ingress, the loss of balance of the helicopter had overloaded the floats. Besides, evidence showed that the bonding of the patches on the main vessel of the floats was the starting point of the failure.

An unused life jacket recovered from the helicopter, the vacuum seal of which was found torn, was sent to the manufacturer for investigation. The manufacturer had provided CAD with the findings of the investigation. These findings are being analysed by CAD.

6. STATUS OF THE INVESTIGATION

The accident investigation is on-going and focusing on the cause of out-of-balance tail rotor operation, in particular the failure of the White blade that might have resulted in high vibration that ruptured the upper section of the vertical tail from the helicopter.

Issued on 29 June 2011

This Interim Statement contains facts relating to the accident as determined up to the time of issue. The information must be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

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Accident Bulletin 4/2011

(An update to Accident Bulletin 2/2010 and Interim Statement 2/2011)

Aircraft Type:	AgustaWestland AW139
Registration:	B-MHJ
Year of Manufacture:	2008
Number and Type of Engines:	Two Pratt & Whitney PT6C-67C turbo-shaft engines
Date and Time of Accident:	3 July 2010 at 0400 hours UTC (1200 hours local time)
Place of Accident:	About 370m north-west of Sheung Wan / Sky Shuttle Heliport, Hong Kong (VHSS)
Nature of Accident:	Shortly after take-off from Sheung Wan / Sky Shuttle Heliport (ashore Victoria Harbour) for Macao, B-MHJ ditched into the harbour north-west of the heliport.
Type of Flight:	Chartered Public Transport
Persons on Board:	Crew: 2 Passenger: 11
Fatalities:	Nil
Serious Injuries:	Crew: Nil Passenger: Nil
Commander's Licence:	Airline Transport Pilot's Licence (Helicopters)
Commander's Age:	45
Commander's Experience:	6,120 hours (of which 350 hours were on type)
Other Crew:	Cockpit: One Co-pilot Cabin: Nil

All times in this Bulletin are in Coordinated Universal Time (UTC) with Hong Kong Local Time in parenthesis.

Update on Investigation of Helicopter Accident on East Asia Airlines EA 206A on 3 July 2010 (AgustaWestland AW139 Registration Mark B-MHJ)

The Civil Aviation Department of the Government of the Hong Kong Special Administrative Region (CAD) issued Accident Bulletin 2/2010 and Interim Statement 2/2011 on 27 July 2010 and 29 June 2011 respectively on the investigation of the accident on East Asia Airlines EA 206A on 3 July 2010. This Accident Bulletin provides further available information as the investigation progresses.

Focus of Investigation

2. After the accident, the tail rotor and tail gearbox assembly detached from the helicopter was salvaged from the Victoria Harbour. However, a major portion of a tail rotor blade, designated as White Blade, was found broken off from the tail rotor. The breakage occurred at the blade root area, leaving behind a short U-shaped portion of the blade remained attached to the tail rotor hub. The broken portion of the White Blade could not be recovered. The focus of the investigation is to identify the circumstances leading to the breakage of the White Blade and the detachment of the tail rotor and tail gearbox assembly.

Forensic Engineering Analysis

3. The White Blade is constructed of composite materials. After the accident, CAD contracted QinetiQ, a defence technology agency in the United Kingdom with expertise in forensic engineering of aircraft composites, to perform the necessary tests and examination of the salvaged tail rotor and tail gearbox assembly, and the fractured part of the vertical tail section. In September 2010, the investigation team held a meeting at the Air Accidents Investigation Branch (AAIB) of the United Kingdom, attended by CAD, AAIB, Civil Aviation Authority of Macao Special Administrative Region (AACM), Agenzia Nazionale per la Sicurezza del Volo (ANSV) of Italy, AgustaWestland and QinetiQ. The meeting defined the scope of work to be undertaken by QinetiQ on the salvaged parts.

4. The scope of work examined by QinetiQ focused on the tail rotor hub, the remained portion of the White Blade, the Blue Blade, Yellow Blade and the fractured part of the vertical tail section. Specialised techniques such as Scanning Electron Microscope Inspection, X-ray Tomography, Differential Scanning Calorimetry and

Burn-off Test, etc., were applied when necessary.

5. QinetiQ submitted the examination report (the QinetiQ Report) to CAD in July 2011. After a detailed review of the QinetiQ Report, CAD noted that the examined samples of the Blue Blade, Yellow Blade and the remained portion of the White Blade indicates that these blades did not comply fully with AgustaWestland's specifications. Manufacturing discrepancies such as undersize and high level of porosity of the upper and lower straps of the blade samples were identified.

AW139 Accidents in Qatar and Brazil

6. On 2 May and 19 August 2011, there were two AW139 accidents occurred in Qatar and Brazil respectively. The preliminary information of these two accidents indicated tail rotor blade breakage and tail rotor detachment, very similar to that of B-MHJ. These accidents are being investigated by the respective Qatar Civil Aviation Authority (QCAA) and Centro de Investigacao e Prevencao de Acidentes Aeronauticos (CENIPA), along with ANSV.

7. Subsequent to the accident in Qatar, the European Aviation Safety Agency (EASA), the Type Certification Authority of AW139 helicopters, have issued Airworthiness Directive (AD) 2011-0081 on 9 May 2011 to require the inspection of AW139 tail rotor blades of prescribed part numbers at intervals not exceeding 25 Flight Hours in accordance with the instructions of BT 139-251 published by AgustaWestland. After the accident in Brazil, EASA further issued AD 2011-0156-E on 25 August 2011 to additionally require the replacement of AW139 tail rotor blades of prescribed part numbers after the blades have accumulated or exceeded 600 Flight Hours or 1500 Flight Cycles in accordance with the instructions of BT 139-265 published by AgustaWestland.

Information Exchange with Other Parties

8. During the course of the B-MHJ investigation, CAD have maintained close coordination with EASA, ANSV and AgustaWestland and provided the latest investigation information to the parties concerned. After the two AW139 accidents in Qatar and Brazil, CAD have also shared the relevant information with the local investigation authorities in a timely manner. CAD will continue to liaise with these parties on the investigation and the sharing of information in the interest of safety.

9. On 17 to 19 October 2011, ANSV hosted a meeting at Rome that also involves CAD, AACM, QCAA, CENIPA, EASA, Ente Nazionale per l'Aviazione Civile (ENAC) of Italy and AgustaWestland. The objectives of the meeting are to facilitate technical information exchange, experience sharing and more comprehensive understanding of the circumstances leading to the occurrence of the three AW139 accidents in Hong Kong, Qatar and Brazil where similar evidence of tail rotor blade breakage and tail rotor detachment was found.

Further Analysis and Investigation

10. CAD considered that the manufacturing process of the AW139 tail rotor blades should be reviewed in light of the discrepancies identified by QinetiQ. Also, further static, fatigue, dynamic and aerodynamic tests and analyses would be required to determine the cause of the breakage of the White Blade and the detachment of the tail rotor and tail gearbox assembly. The performance of these review, tests and analyses will require reference to proprietary and confidential manufacturing, design and certification data of AW139 helicopters which are maintained by AgustaWestland (the manufacturer of AW139 helicopters), ENAC (the Competent Authority responsible for the Production Approval of AgustaWestland) and EASA (the Type Certification Authority of AW139 helicopters). While the investigation is on-going and without prejudicing its final conclusions, the investigation team considers necessary to issue the following Recommendations:

Recommendation 2011-3:

Ente Nazionale per l'Aviazione Civile, jointly with AgustaWestland, to review the manufacturing process of the AW139 tail rotor blades to determine the causes of the discrepancies identified in the QinetiQ Report and evaluate their effects.

Recommendation 2011-4:

European Aviation Safety Agency to require AgustaWestland to perform static, fatigue, dynamic and aerodynamic tests and analyses on AW139 tail rotor blades so as to minimise the possibilities of tail rotor blade failure which could have been caused by one or the combination of these effects.

If during the course of the investigation, further safety recommendation is considered necessary, it will be issued immediately.

Issued on 18 November 2011

This Accident Bulletin contains facts relating to the accident as determined up to the time of issue. The information must be regarded as tentative and subject to alteration or correction if additional evidence becomes available.