AAIS Case Reference: 01/2013

AIR ACCIDENT INVESTIGATION SECTOR

PRELIMINARY

AIR ACCIDENT INVESTIGATION REPORT

LOC-G: Loss of control – Ground

Bell Helicopter-Textron 206-3B
A6-FTI
Al Ain/Training Area 6
United Arab Emirates
02 January 2013

General Civil Aviation Authority
of the
United Arab Emirates

Air Accident Investigation Sector
General Civil Aviation Authority
United Arab Emirates

AIR ACCIDENT INVESTIGATION SECTOR STATEMENT

THIS INVESTIGATION HAS BEEN CARRIED OUT IN ACCORDANCE WITH THE GENERAL CIVIL AVIATION AUTHORITY CAR PART VI AND ANNEX 13 TO THE ICAO CONVENTION ON INTERNATIONAL CIVIL AVIATION.

THE SOLE OBJECTIVE OF THE INVESTIGATION OF AN ACCIDENT OR INCIDENT SHALL BE THE PREVENTION OF ACCIDENTS AND INCIDENTS.

IT SHALL NOT BE THE PURPOSE OF SUCH AN INVESTIGATION TO APPORTION BLAME OR LIABILITY.

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ACCIDENT SYNOPSIS

During a training flight from Al Ain International Airport [OMAL], a Bell Helicopter Textron 206-3B helicopter operating in the north western training area's eastern helipads, lost control while on the ground as a student pilot [SP] attempted to transition to the hover for a solo circuit resulting in an aircraft rollover - the rotor system contacted the terrain, causing major structural damage to the aircraft.

ABBREVIATIONS/PHRASES USED IN THIS REPORT

Instructor	Captain/Instructor Pilot
CBR	California Bearing Ratio
CPL[H]	Commercial Pilot Licence - Helicopter
DFDR	Digital Flight Data Recorder
ICAO	International Civil Aviation Organization
GCAA	General Civil Aviation Authority
OMAL	Al Ain International Airport
SP	Student Pilot
TA6	Training Area Six
UTC	Coordinated Universal Time

Table 1. Abbreviations/Phrases Used In This Report

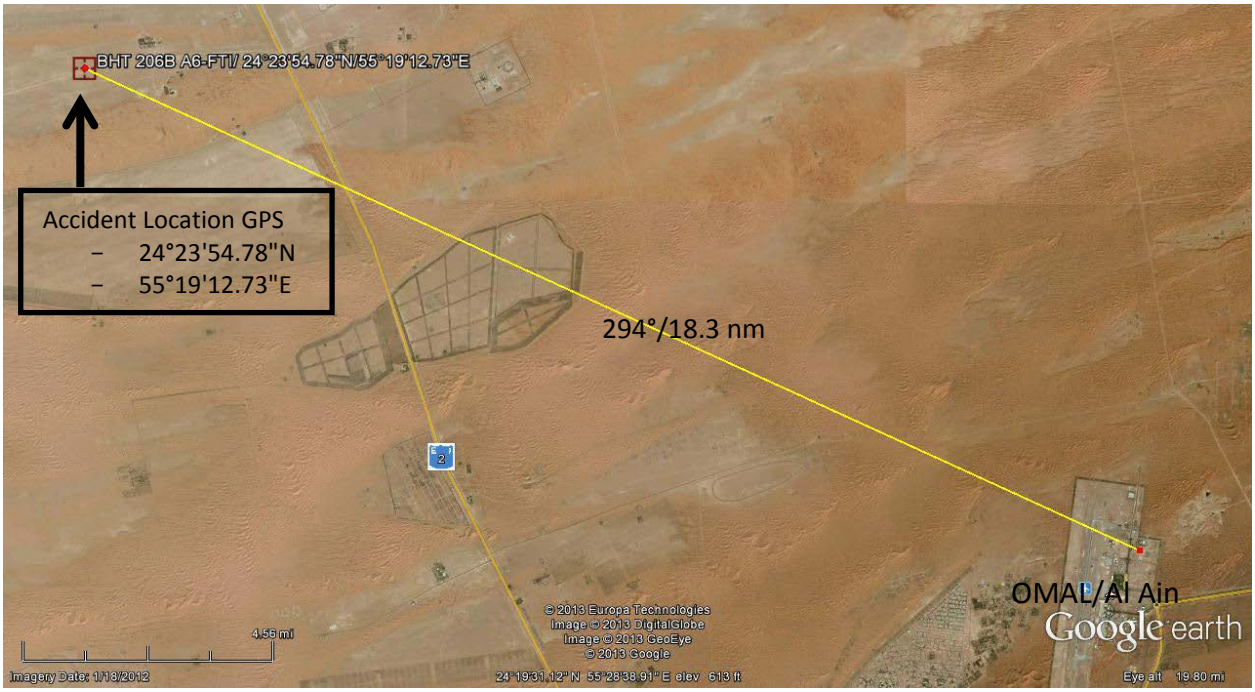
FACTUAL INFORMATION INDEX

ICAO Annex 13, part 1: Factual Information, has nineteen [19] sub-headings detailing each aspect of the investigation to be reported.
Where information in respect of any of the items in the Factual information is not available, or is irrelevant to the circumstances leading to the accident, the appropriate subheadings are excluded for clarity.

INDEX OF TABLES/PHOTOS/DIAGRAMS

1. FACTUAL INFORMATION

1.1. History of the flight



Overview 1. Google Earth Overview - Accident location/airport proximity

The student was the handling pilot for the departure from the fixed operating base at Al Ain International Airport [OMAL] to the training area to the north west of the airport designated as Training Area 6 [TA6].This sortie was briefed as a pre-first solo flight.

The flight operated as a dual proficiency check following the new year cessation of flying activity. The instructor flew a series of circuits in the training area with the student prior to a briefing to the student pilot for a first solo flight.

The Instructor then briefed the student for the solo flight and that the instructor would be standing in view of the student at a point of the helipad periphery. There is no radio contact between the student and the instructor – the instructor indicates via hand signals the all clear above and behind and corrective action requirements if necessary.

Prior to the instructors egress, the instructors' statement includes a comment concerning the change of the aircraft Center of Gravity [CG] that was made to the student during the pre-solo briefing.

The student was instructed to pick up to the hover temporarily and then lower the collective until the aircraft had returned to a landed position to judge the lateral control requirements with the change of CG to the right.

The briefing was then to pick up into the hover, transition into the climb and complete a full circuit.

As the student picked up into the hover, the aircraft started to yaw[1] to the right. The Instructor's – using hand signals – attempted to get the student to push the cyclic to the left.

The student applied left pedal to arrest the yaw, the aircraft then rolled rapidly to the right , followed by the main rotor blades contacted the terrain and the aircraft rolled 90° onto the right-hand side

The student evacuated the aircraft.

1.2 Injuries to persons

Injuries	*Crew*	*Pax*	*Others*
Fatal	0	0	0
Serious	0	0	0
Minor/None	1	0	

Table 2. Injuries to Persons

1.3 Damage to aircraft

The aircraft was damaged beyond economic repair.

Photo 1: BHT 206-B Accident Aircraft

[1] The yaw axis is defined as perpendicular to the body of the lifting surface with its origin at the center of gravity and directed towards the bottom of the aircraft.

Photo 2: Aerial View

1.5. Personnel information

1.5.1. The Instructor holds :

(1) current GCAA CPL[H] #50505
(2) a current B206 Type Rating
(3) Current valid Medical

1.5.2. The student/cadet has a valid medical. [2]

1.6. Aircraft information

1.6.1

Type	Bell Helicopter Textron AB206-3B
Registration	A6-FTI
S/N	4064
State of Design	Canada
State of Manufacture	Canada
Year manufactured	1983
Engine	Rolls Royce M250

Table 3. Aircraft Data

1.6.2 Helicopter Description – Bell Helicopter Textron BHT 206-B3

A single pilot, five place, single engine light helicopter with a two-blade semi-rigid main rotor, and a tail rotor that provides directional control.

The airframe consists of a semi-monocoque[3] fuselage with metal and fiberglass covering; an aluminium-alloy monocoque tail boom that supports the vertical fin, fixed horizontal stabiliser, tail rotor and tail rotor drive train.

[2] The GCAA does not issue Student Pilot Licenses. The Student is required to have a Class A medical, enrolled in a flight training program and have a valid type rating.

The primary load carrying structures are two built in cabin bulkheads, a vertical control tunnel from the floor to the cabin roof and a pair of longitudinal beams in the cabin roof.

The landing gear is a tubular skid type fabricated from aluminium alloy

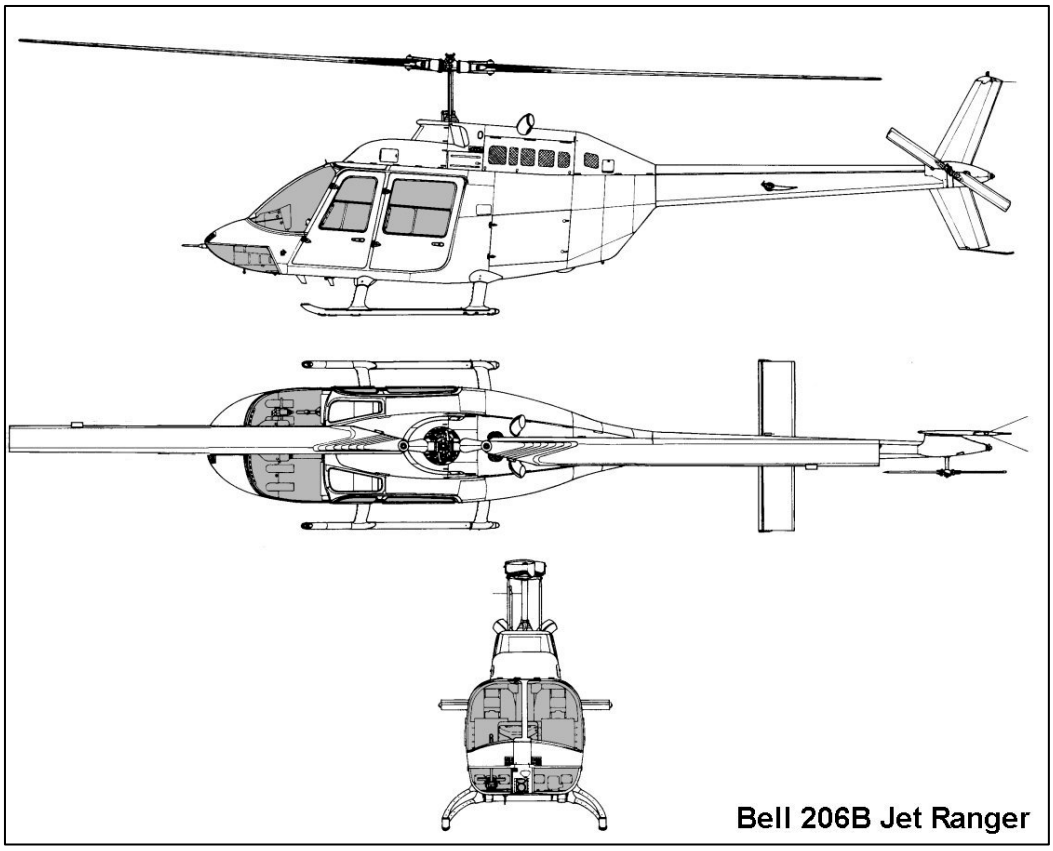


Figure 1. General Dimensions BHT 206-3B

1.6.3 The aircraft was airworthy at the time of the accident. GCAA Airworthiness certificate was valid until 7th April 2013.

1.6.4 Estimated All Up Weight at the time of the accident was 1174kg/2589 lb with the single pilot CG within acceptable limits

1.6.5 Aircraft Center of Gravity [CG] Management

The Center of Gravity reference coordinates are calculated with the lateral and longitudinal moments predicted on the inputs into the flight planning software typically for fuel, crew load and passenger loads. The flight planning software used by the operator for the training exercise planning will indicate to the planner if the CG is out of limits and prevent the flight planning from progressing until an correction is made inside the allowable limits.

1.6.6 Stability and Control

The stability and control of a helicopter depends on the net effect of all the forces

[3] A Semi-monocoque system uses a substructure to which the outer skin is attached. The substructure, which consists of bulkheads and/or formers of various sizes and stringers, reinforces the stressed skin by taking some of the bending stress from the fuselage

and moments applied to the helicopter from control inputs, helicopter motion, or external sources, which can include moments generated around fixed points of the helicopter such as the landing skids in contact with the ground.

1.6.7 Control Methods

To control the helicopter in flight, the forces, loads and moments about all three axes of the helicopter must be controlled. This involves controlling three forces and three moments.

As with most conventional rotary winged aircraft, the pilot has control available around all three axes

A typical helicopter has three separate flight control inputs. These are the cyclic stick, the collective lever, and the anti-torque pedals

1.6.8 Critical Roll Angle – Ground

If a roll rate is permitted to develop while part of the landing assembly is on the ground, a Critical Bank Angle (the angle between the helicopter and the horizon) may be reached where roll cannot be corrected, even with full lateral cyclic, and the helicopter will roll over onto its side.

As the roll rate increases, the angle at which recovery is still possible significantly reduces as a function of the angular declination from the horizontal, the combination of rotational inertia and the moment generated around the fixed point, in conjunction with the inability of the lateral control to reduce or arrest the onset or developing roll rate.

The critical rollover angle is further reduced under the following conditions:

- Right Side Skid Down Condition
- Crosswinds
- Lateral Center Of Gravity (CG) Offset to the right in an anticlockwise turning rotor[4]
- Main Rotor Thrust Almost Equal to The Helicopter Weight
- Left Yaw Inputs

If the condition is permitted to develop beyond the critical roll angle, a combination of rotational inertia and coupling moments can lead to a recognised accident causal factor described as Dynamic Roll Over.

1.7 Meteorological information

1.7.1. Meteorological Information for Al Ain International Airport [OMAL] 02 January 2013 was as follows:
METAR[5]/TAF[6]

METAR/TAF /Al Ain/OMAL/04th September 2012
METAR OMAL 020100Z 10007KT CAVOK 16/03 Q1018 A3007
METAR OMAL 020200Z 10007KT CAVOK 16/03 Q1019 A3009

[4] Direction of travel when viewed from the above
[5] Aviation Routine Weather Report (METAR)
[6] Terminal Area Forecast

METAR OMAL 020300Z 10007KT CAVOK 16/04 Q1019 A3011
METAR OMAL 020400Z 10007KT CAVOK 16/04 Q1020 A3013
METAR OMAL 020500Z 11006KT CAVOK 18/05 Q1021 A3014
METAR OMAL 020600Z 18009KT CAVOK 20/07 Q1021 A3017
METAR OMAL 020700Z 16007KT CAVOK 22/07 Q1021 A3016
METAR OMAL 020800Z 17005KT CAVOK 23/06 Q1020 A3013
METAR OMAL 020900Z 23004KT 190V290 CAVOK 24/06 Q1019 A3010
METAR OMAL 022100Z 01008KT CAVOK 16/02 Q1019 A3009
METAR OMAL 022200Z 02007KT CAVOK 15/04 Q1019 A3009
METAR OMAL 022300Z 03007KT CAVOK 15/05 Q1019 A3009
TAF OMAL 012300Z 0200/0306 10007KT CAVOK
BECMG 0208/0810 30008KT
BECMG 0216/0218 36006KT
BECMG 0220/0222 11006KT=
FTER21 OMAA 020500
TAF OMAL 020500Z 0206/0312 24006KT CAVOK
BECMG 0208/0210 30008KT
BECMG 0216/0218 36006KT
BECMG 0220/0222 11006KT
BECMG 0306/0308 32012KT=

Table 4. Meteorological Information OMAL 02 January 2013

1.10. Aerodrome information.

1.10.1. The accident location is in a defined training area 18.25nm north west of the aerodrome indicated as Training Area 6 [TA6], a rotary wing training area.

1.11. Flight Recorders

1.11.1. No data recorders are required to be carried on this aircraft

1.11.2. The aircraft do not carry GPS tracking devices with a real time tracking facility or a download

1.12. Wreckage and Impact Information.

1.12.1 The location of the accident was in TA6. The wreckage was localised in the immediate accident area, with one main rotor blade 126 meters from the fuselage to the west of the accident site.

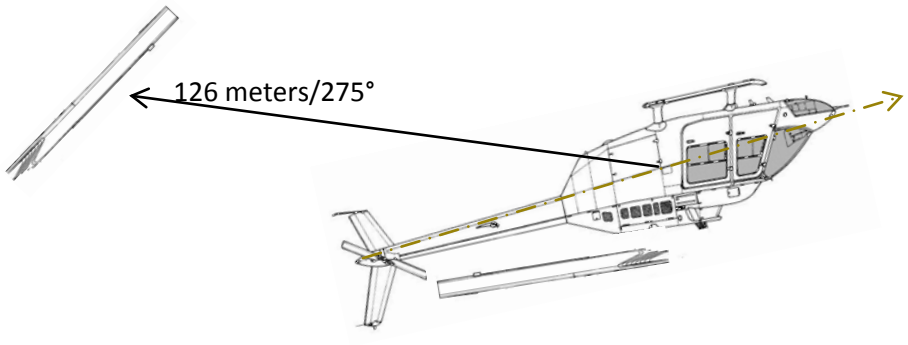


Figure 2 Wreckage Location – View from above orientated on North [360°]

1.12.2. The GPS location for the accident in TA6 was:

LAT 24° 23’ 54.73” N

LONG 55° 19’ 17.71” E

1.12.3. The accident site was 18.3 nm from OMAL on a radial of 294° from the operators fixed base.

1.12.4. The accident site surface is level compacted sand, with an estimated CBR[7] of 3-4, with a blown and drift sand accumulations scattered locally.

1.12.5. The wreckage is localised to the immediate area of impact with exception of one main rotor blade 126 meters from the main accident site. The majority of the wreckage is localised in one location.

1.12.6. There was pooling of leaking fuel from the fuel tank.

1.13. Medical and Pathological Information.

1.13.1. The student pilot was conscious and mobile following the accident.

1.13.2. GCCA regulations dictate a post-accident medical for alcohol and drug screening, this has been completed

1.14. Fire

1.14.1. There was no post impact fire

[7] California bearing ratio (CBR) is a test for evaluation of the compressive/mechanical properties of terrain substrata material.

1.15. Survival Aspects

1.15.1. The pilot survived the impact with minimal injury

1.15.2. The available living space in the cockpit remained intact.

1.15.3. The crew seats remained intact as did the crew restraints/harnesses and support fittings.

1.15.4. The pilot was not wearing Aviation Life Support Equipment [ALSE] such as a combined communications systems and cranial protective helmet.

Final Report Notification

i Upon completion of the factual data collection, analysis, determination of the root cause and causal factors associated with the investigation's conclusions the Air Accident Investigation Sector will determine which safety recommendations are required.

ii These will be detailed in the Final Investigation report which will be published within one year of the accident

GCAA Investigation General Information

The GCAA Air Accident Investigation Sector [AAIS] will provide updates on the investigation in line with the recommendations of ICAO Annex 13.

If no cause has been identified within 12 months of this accident, an Interim Accident Report will be published to update on the progress of the investigation.

Any specific safety issues identified during the course of the investigation will be advised to all parties through the GCAA Safety Recommendations (SR) procedures.

Contact Information

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To report an aircraft accident or serious incident contact the GCAA Duty Inspector (24/7) on this number +971506414667 immediately.