



# Incident Investigation - Summary Report – Aircraft collision with building

AAIS Case AIFN 0006/2011

Agusta 109S  
A6-FLS  
Dubai  
United Arab Emirates  
18 April 2011



الهيئة العامة للطيران المدني  
GENERAL CIVIL AVIATION AUTHORITY

Air Accident Investigation Sector  
General Civil Aviation Authority  
The United Arab Emirates

## Investigation Objective

This investigation was performed pursuant to the UAE Federal Act No 20 (1991), promulgating the Civil Aviation Law, Chapter VII, Aircraft Accidents, Article 48, CAR Part VI Chapter 3, in conformity with Annex 13 to the Convention on International Civil Aviation and in adherence to the Air Accidents and Incidents Investigation Manual.

The object of this safety investigation is to prevent aircraft accidents and incidents by identifying and reducing safety-related risk. The GCAA AAIS investigations determine and communicate the safety factors related to the transport safety matter being investigated.

All GCAA AAIS reports are publicly available from:

<http://www.gcaa.gov.ae/en/epublication/pages/investigationreport.aspx>

It is not a function of the GCAA AAIS to apportion blame or determine liability.

The information contained in this Final Report is derived from the factual information gathered during the investigation of the occurrence. The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the Accountable Manager, President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.

This Final Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with item 3.1, Annex 13 to the Convention on International Civil Aviation, which was incorporated in the UAE legal system.

The use of this Final Report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.



INCIDENT	
NAME OF THE OPERATOR	Falcon Aviation Services
NAME OF THE OWNER	Falcon Aviation Services
MANUFACTURER	Agusta
AIRCRAFT MODEL	109S
NATIONALITY	UAE
REGISTRATION	A6-FLS
LOCATION	Dubai
DATE & TIME	18 April 2011, 12:42 <sup>1</sup>

Notes:

- a) Whenever the following words are mentioned in this Report with first Capital letter, they shall mean the following:
- Aircraft- the helicopter involved in this Incident;
  - Investigation- the investigation into the circumstances of this Serious Incident;
  - Incident- this Incident referred to on the title page of this report;
  - Report- this Incident final report;
  - Team- the GCAA AAIS Investigation Team;
  - Pilot- the Incident Helicopter handling pilot.
- b) Unless otherwise mentioned, all times in the report are Local Time (Local time in UAE was UTC+ 4h);
- c) Photos and figures used in this Report are taken from different sources and are adjusted from the original for the sole purpose to improve the clarity of the Report. Modifications to images used in this Report are limited to cropping, magnification, file compression, or enhancement of color, brightness, contrast, or addition of text boxes, arrows or lines.

<sup>1</sup> The Occurrence's reference time used in the Report was the time as recorded by the helicopter digital acquisition unit.



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## ABBREVIATIONS

A/C	Aeroplane
AAIS	UAE GCAA Air Accident Investigation Sector
A&C	Airframe and Engines
AFM	Aircraft Flight Manual
AGL	Airfield Ground Light
AMC	Acceptable means of compliance
AMM	Aircraft Maintenance Manual
AMO	Approved Maintenance Organization
AMS	Approved Maintenance Schedule
amsl	above mean sea level
ANSV	Agenzia nazionale per la sicurezza del volo, Italian National Agency for the Safety of Flight
ATC	Air Traffic Control
ATPL	Air Transport Pilot License
AWOPS	All Weather Operations
AWS	Additional Work Sheets
CAAP	Civil Aviation Advisory Publication
CAR	UAE Civil Aviation Regulation
CAR-OPS	UAE Civil Aviation Regulation – UAE Certified Operators
CAR-OPS 3	UAE Civil Aviation Regulation for commercial air transport and private operations of helicopters
CAT	Category
CAVOK	Cloud and Visibility OK
CFI	Certificated Flight Instructor
CG	Centre of Gravity
C of A	Certificate of Airworthiness
COM	Communication
CVR	Cockpit Voice Recorder
Cm	centimeter
CMR	Certificate of Maintenance Review
CPL	Commercial Pilot License
DAU	Digital Acquisition Unit
Degs	Degrees
E	East
ELP	English Language Proficiency
FAA	Federal Aviation Administration
FAS	Falcon Aviation Services
FDR	Flight Data Recorder
FE	Flight Examiner
FMGS	Flight Management and Guidance System



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FTO	Flight Training Organization
GA	General Aviation
GCAA	UAE General Civil Aviation Authority
Hrs	hours
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IIC	Investigator in Charge
Kg	kilogram
KIAS	Knots Indicated Air Speed
Km	kilometres
Ldg	Landing
LH	Left Hand
LOFT	Line Oriented Flight Training
LST	License Skill Test
LT	Local Time
M	meters
Mb	Millibars
MCC	Multi Crew Co-operation
METAR	Meteorological Terminal Air Report
MHz	Mega Hertz
Mins	minutes
MPM	Maintenance Program Manual
MSI	Major Structural Inspection
MSN	Manufacturer Serial Number
N	North
NASA	National Aeronautic and Space Administration
NTSB	National Transportation Safety Board
OHM	Operating Helicopter Manual
OK	all correct
PW	Pratt & Whitney
QNH	barometric pressure adjusted to sea level
RH	Right Hand
RWY	Runway
ROSI	UAE's Mandatory Reporting System (Reporting of Safety Incident)
SARPS	Standard and Recommended Practices (of ICAO)
Secs	seconds
SN	Serial Number
SOP	Standard Operating Procedures
SPECI	Aerodrome special meteorological report
p/n	Part Number



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Tach	Tachometer
TAF	aerodrome forecast
TM	Training Manual
TO	Take Off
TSB	Transportation Safety Board of Canada
TSO	Time Since Overhaul
TSN	Time Since New
UAE	United Arab Emirates
UTC	Co-ordinated Universal Time
VFR	Visual Flying Rules
VHF	Very High Frequency
WMO	World Meteorological Organization



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## Synopsis

The Air Accident Investigation Sector (AAIS) of the GCAA became aware of the event after receiving an electronic notification from the Assistant Director General of Aviation Safety Affairs, on the 19 May 2011. The following day the AAIS initiated the investigation.

The Team coordinated with all stakeholders by initiating the accident investigation process according to prepared and previously exercised plans.

On April 18, 2011, at approximately 16:42 local UAE time, an Agusta 109S, registration A6-FLS, while ground taxiing to position the aircraft for passenger embarkation the main rotor blades came into contact with an adjacent wall.

In accordance with the requirements of Annex 13 to the Convention on International Civil Aviation, the following authorities were notified; the NTSB<sup>2</sup>, the ANSV<sup>3</sup> and the TSB<sup>4</sup>. The NTSB, the ANSV and the TSB did not appoint an accredited representative, but were available to assist the AAIS with the investigation.

The Air Accident Investigation Sector (AAIS) of the GCAA led the investigation, as the United Arab Emirates (UAE) was the State of Occurrence and published the final report.

The occurrence was initially classified by the GCAA AAIS as a Serious Incident. However, following inspection of the engine by the manufacturer, it was found that there was no damage to the engine and therefore the occurrence was reclassified as an Incident, in accordance with ICAO Annex 13 and the United Arab Emirates CAR-PART VI, Chapter 3. The reclassification, as an Incident, reflects circumstances

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<sup>2</sup> The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident the United States and significant accidents in other modes of transportation – railroad, highway, marine and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the Federal Government and other organizations to provide assistance to victims and their family members impacted by major transportation disasters ( <http://www.nts.gov/about/index.html>).

<sup>3</sup> Agenzia Nazionale per la Sicurezza del Volo (ANSV, "National Agency for the Safety of Flight") is the Italian aircraft accident investigation agency. The ANSV is headquartered in Rome and it was established according to legislative decree No. 66 on 25 February 1999 (<http://www.ansv.it/It/Index.asp>).

<sup>4</sup> The Transportation Safety Board of Canada (TSB) is an independent agency that advances transportation safety by investigating occurrences in the marine, pipeline, rail and air modes of transportation( <http://www.tsb.gc.ca/eng/>).



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indicating that there was not a high probability of an accident and because the subsequent engine teardown and inspection did not reveal any major structural damage. Additionally the extend of the rotor blades damage could not be confirmed in the initial period following the event.

The Investigation has concluded that the cause of this Occurrence was:

The Helicopter main rotor blades contacted the wall of a building due to distraction of the pilot as he attempted to avoid contact with a foreign object, which had suddenly come into his vision.

Additionally the Final Report contains three Safety Recommendations to:

the GCAA ANA

SR 07/2014

Should ensure that the anticipated regulations and safety oversight are extended to all heliport locations, whether providing an Air Service or for private use.

the GCAA Flight Operations:

SR 08/2014

Should ensure that safety oversight is extended to all heliport locations, whether providing an Air Service or for private use.

SR 09/2014

Should ensure that all Operators' Operations Manuals include a clear notification process in case of an accident or a serious incident.

Safety Actions Taken

During the course of this investigation the GCAA took the following Safety Actions:

- a. The UAE GCAA established a direct telephone line, under the name "Duty Investigator", for the easier notification of accidents and serious incidents.
- b. The UAE GCAA published a Directive, and Information Bulletin, alerting all UAE certificate holders of the new notification process.
- c. The UAE GCAA initiated a "roadshow" which visited all aerodromes and all stakeholders were invited to participate in a briefing regarding the Duty Investigator process.
- d. The UAE GCAA initiated training for all post-holders involved in safety roles.



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## 1. Factual Information

### 1.1 History of the flight

The occurrence Helicopter is one of two Agusta 109S helicopters operated out of a private residence, in the Dubai Emirate area, in order to facilitate the needs of the Operator's client.

On April 18, 2011, at approximately 16:42 UAE local time, the occurrence Helicopter engine was started by the Pilot, who was also the accountable manager of the Operator, for an unscheduled, on-demand flight, from the private residence to Abu Dhabi. The Pilot's intention was to fly the helicopter under visual meteorological conditions and he received meteorological information along with route and a destination briefing.

Following an uneventful engine start, the pilot elected to taxi the helicopter away from the designated helicopter landing area and to position it near the residence building to embark the passengers. While ground taxiing the aircraft the main rotor blades came into contact with an adjacent wall (see figure 1).

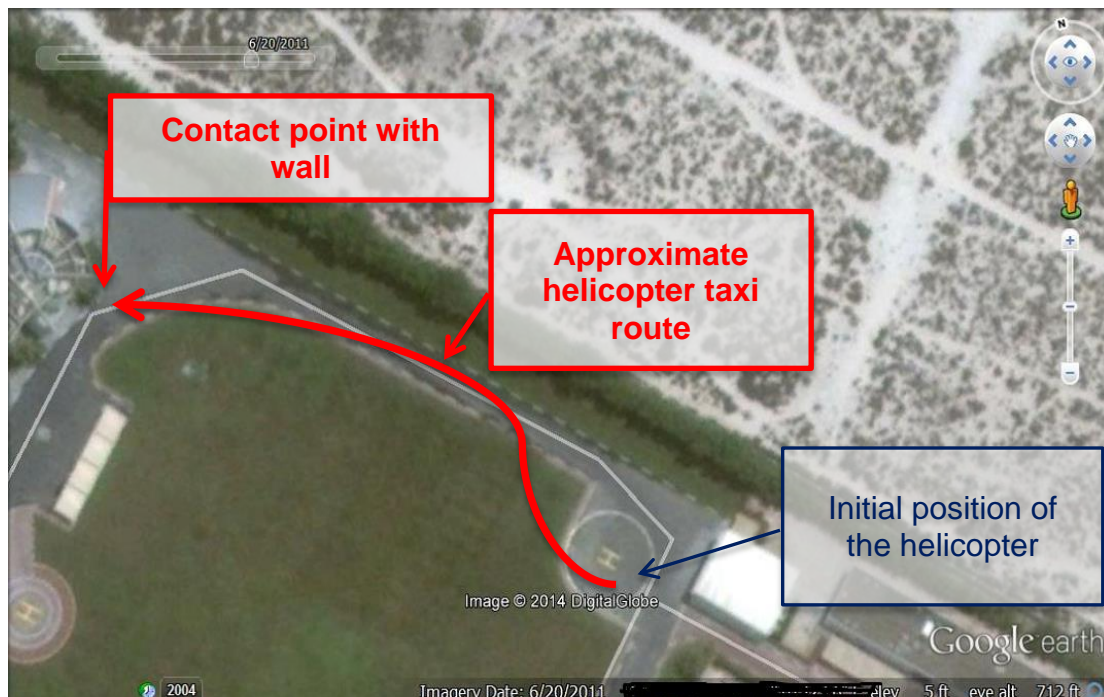


Figure 1. Approximate taxi route of the Incident helicopter

The pilot stated that a clear plastic, most probably a bag from a nearby construction site, “*came close to the aircraft main rotor*”, and distracted him. He stated that he “*moved to avoid*” the FOD. He also stated that the wall angle gave him a false sense of clearance at eye level (see figure 2).



Figure 2 Point of contact of the main rotor blades with the reinforced wall

### 1.1.1 Post Incident Flight

Following the contact with the wall, the Pilot requested for main rotor blades boxes<sup>5</sup> to be shipped to the private residence, because, as per the pilot, the helicopter would be transported outside the UAE for the client’s needs. The Pilot of the occurrence Helicopter informed the Operator’s transportation unit that the helicopter would be transported by road, to a nearby airport, from where it would be airlifted to its final destination. This plan raised questions from the Operator’s management, as during previous airlifts the helicopter was flown to the point of airlift, and the main rotor blades were removed just prior to uplift.

During the evening of Monday 25 April, the Helicopter Pilot advised the Operator’s management that the need for airlifting the helicopter outside the country was canceled. However, the Main Rotor Blades had already been removed, by the Operator’s maintenance personnel, from A6-FLS and had already been shipped

<sup>5</sup> Main rotor blade box is a container, specialized to safe transport the helicopter’s main rotor blades after being removed from the helicopter.



along with other equipment. However, the Helicopter was still at the private residence.

The following day the Pilot informed the Operator's management that the rotor blades (apparently now in the shipping containers) had been damaged during the loading/unloading involving the Cargo Aircraft.

The pilot involved in the occurrence then instructed the Operator's Logistics Manager to research the availability of new main rotor blades. However other post-holders suggested that the blades should be recovered, inspected and that an insurance claim be raised.

Nevertheless, the Logistics Manager commenced communications with the helicopter manufacturer regarding the availability of new rotor blades. At the same time the occurrence Pilot was unable to inform other post-holders of the whereabouts of the removed blades.

The Logistics Manager advised that 4 new Main rotor blades would be available on 2 May. Between the 3 and 9 of May various management personnel tried unsuccessfully to determine the whereabouts of the removed rotor blades. On several occasions the occurrence Pilot was asked if the blades had been involved in an operating incident. However, the pilot denied that such was the case.

An Operator's engineer prepared the aircraft for service while awaiting delivery of the new main rotor blades. He conducted several scheduled maintenance tasks. These tasks were recorded In Technical log book pages 11592 & 11593 and were cross referenced to additional worksheets AWS 9307 to 9310.

The main rotor blades arrived in the mid-afternoon of the 10 May, and were installed. Initial ground track & balance runs were carried out. These maintenance actions were suspended due to loss of daylight.

The following morning other engineers arrived at the private residence to continue the track and balance procedures.

The Operator's management initiated an investigation on the whereabouts of the removed rotor blades, which revealed the following:

- Main rotor of A6-FLS contacted a wall of the private residence during a taxi event
- All four blades sustained tip damage,

When the above were found, the Operator grounded the helicopter and stopped all maintenance actions, until further notice.

During the following day, the Operator’s management team met the Pilot and it was confirmed that A6-FLS had suffered a main rotor blade strike.

The pilot informed management, that during taxiing to reposition the helicopter to facilitate the embarkation of passengers, the main rotor blades struck the wall of a nearby residence. In his effort to minimize the consequences of his action and hide the event from the Operator and the Authorities, all the evidence was destroyed.

The Operator’s management team, internal investigation revealed that the Pilot did not follow the company’s SOP in relation to reporting of incidents. In addition, the Operator’s management decided that A6-FLS required a complete sudden stoppage inspection in accordance with the maintenance manual.

On Sunday 15<sup>th</sup> May during a meeting with the GCAA Aviation Safety Affairs Sector, the Operator’s Management shared all known factual information.

The Operator Management considered that the engineers actions in concealing the event were a significant contributory factor in the failure to report the event, and his company approval was removed.

## 1.2 Injuries to Persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Others</i>
Fatal	0	0	0
Serious	0	0	0
Minor/None	1	0	

Table 1. Injuries to Persons

## 1.3 Damage to aircraft

The extent of the damage could not be confirmed, as the removed rotor blades had been destroyed, prior to formal assessment of the damage.

## 1.4 Other damage

The rotor blades contacted the reinforced wall of a building, which had paint removed and scratches (see figure 2).

## 1.5 Personnel information

The Pilot was current and rested at the time of the event.

## 1.6 Aircraft information

The AgustaWestland A109S Grand is a light eight-seat, twin-engine multi-purpose helicopter produced by the Italian manufacturer Agusta (today AgustaWestland). The A109S has been manufactured since 2003.

<b>Crew</b>		1-2
<b>Passengers</b>		6-7
<b>Propulsion</b>		2 Turboshaft Engines
<b>Engine Model</b>		Pratt & Whitney Canada PW207C
<b>Engine Power (each)</b>	548 kW	735 shp
<b>max. Cruise Speed</b>	287 km/h	155 kts 178 mph
<b>max. Speed (vne)</b>	311 km/h	168 kts 193 mph
<b>Service Ceiling</b>	6.096 m	20.000 ft
<b>Rate of climb</b>	558 m/min	1830 ft/min
<b>Range</b>	800 km	432 NM 497 mi
<b>Empty Weight</b>	1.655 kg	3.649 lbs
<b>max. Takeoff Weight</b>	3.175 kg	7.000 lbs
<b>Rotor Blades (main/tail)</b>		4/2 4/2
<b>Main Rotor Diameter</b>	10,83 m	35,5 ft
<b>Tail Rotor Diameter</b>	1,94 m	6,4 ft
<b>Rotor Disc Area</b>	92,1 m <sup>2</sup>	991 ft <sup>2</sup>
<b>Length (Fuselage)</b>	11,65 m	38,2 ft
<b>Length</b>	12,96 m	42,5 ft

Table 2. Helicopter Data

TSN	1211:45	1211:45
Position	RH	LH
Impeller cycles	217	235
CT-Disc cycles	2897	2494
PT-Disc cycles	2628	2640
Helicopter SN	22023	
Engine type	PW 207C	PW207C
Engine SN	PC-E BH0058	PCE-BH0051

Table 3. Occurrence Helicopter data

### 1.6.1 Maintenance

The Helicopter was maintained by the Operator under GCAA Part 145 approval number AMO/190/06, with limited line maintenance carried out on site at the occurrence location. Weekly inspections were carried out by a Licensed Engineer. Daily & pre-flight inspections were carried out by the aircraft commander, who was approved to carry out such inspections following training by the Operator. Base maintenance was conducted at the Operator's facilities at Al Bateen.

The following are the technical log book entries prior to the event:

**Monday 18 April** Last recorded flight Technical log book page 11591

The last pilot entry in the technical log book page was a single entry for the flight, with no defect recorded by the pilot:

- Take off time: 10:40
- Landing time: 13:00
- No of landings 2
- No of starts 2

**Tuesday 19 April** The last maintenance entry on technical log book page 11591

- 7 Day inspection (Main rotor blade wash)
- 10 Hour power assurance check
- 5 hour DAU down load

All of the above inspections referenced additional work sheet number 9306 carried out by an Operator's approved engineer. The mass and center of gravity of the Helicopter were within the prescribed limits.



Figure 3. The Occurrence helicopter<sup>6</sup>

<sup>6</sup> [http://www.4shared.com/photo/uldOufef/AGUSTA\\_A-109S\\_GRAND.html](http://www.4shared.com/photo/uldOufef/AGUSTA_A-109S_GRAND.html)

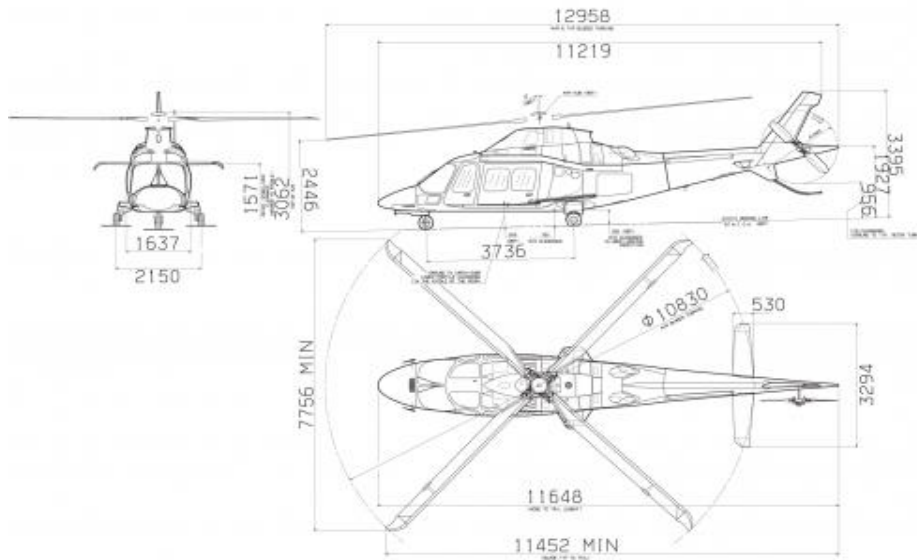


Figure 4. Helicopter dimensions<sup>7</sup>

## 1.7 Meteorological information

The following two tables describe the meteorological information of the nearest airport to the occurrence site. The weather conditions in the area of the event were good with southerly wind light and variable, visibility of six kilometers and the temperature of twenty nine degrees on the Celsius scale. In more detail tables 4 and 5 have the Meteorological Terminal Air Report (METAR)<sup>8</sup> METAR/SPECI<sup>9</sup>- and aerodrome forecast (TAF) of the nearby aerodrome.

METAR/SPECI from OMDB, Dubai International Airport (United Arab Emirates)	
18/04/2011 14:00- UTC	METAR OMDB 181400Z 29008KT 6000 NSC 26/19 Q1009 NOSIG=
18/04/2011 13:00- UTC	METAR OMDB 181300Z 29010KT 250V320 6000 NSC 27/17 Q1009 NOSIG=
18/04/2011 12:00- UTC	METAR OMDB 181200Z 28009KT 240V310 6000 NSC 29/17 Q1010 NOSIG=
18/04/2011 11:30- UTC	METAR OMDB NIL=
18/04/2011 11:00- UTC	METAR OMDB 181100Z 27008KT 200V310 6000 NSC 29/15 Q1010 NOSIG=
18/04/2011 10:00- UTC	METAR OMDB 181000Z 26007KT 170V310 6000 NSC 28/17 Q1011 NOSIG=

Table 4. METAR Dubai International two hours before and after the occurrence

<sup>7</sup> <http://www.agustawestland.com/sites/all/themes/custom/newagusta/print-new-product.html>

<sup>8</sup> Aerodrome routine meteorological reports

<sup>9</sup> Aerodrome special meteorological report (SPECI)

Large TAF from OMDB, Dubai International Airport (United Arab Emirates).

18/04/2011 11:00->	TAF OMDB 181100Z 1812/1918 28012KT 7000 NSC BECMG 1817/1819 22005KT PROB30 1900/1904 3000 HZ BECMG 1906/1908 30013KT=
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Table 5. TAF of Dubai International during the occurrence.

The taxi was commenced in clear daylight hours.

## 1.8 Aids to navigation

No aids to navigation were used for this flight.

## 1.9 Communications

No communication was made during the ground taxiing and there was no requirement to make any communication.

## 1.10 Aerodrome information

The Helicopter taxied within the area of a private residence. The residence included equipped hangers and landing and takeoff areas appropriate for the size and performance category of the helicopter. However, the helipad that was used during the Incident had not been approved nor accepted by the GCAA.

## 1.11 Flight recorders

The helicopter was not equipped with flight recorders. Flight recorders are not required, in accordance with the UAE regulations<sup>10</sup>.

The helicopter was equipped with a data acquisition unit which records engine parameter information for maintenance purposes. This unit's information was downloaded (see figure 5 below) and revealed that on 18 April at 12:42 local time there was a drop of main rotor RPM to 98RPM and a drop of engine N2 with an associated sudden increase of engine torque (see record number 15645).

<sup>10</sup> CAR-OPS 3.700, CAR-OPS 3.705, CAR-OPS 3.715, CAR-OPS 3.720 ( Issue 2, Rev 00, dated January 2014).

Time History Log Display

Aircraft S/N: 22023      Data Channel: A

Date selection mode:  By Download    Date: 18-05-11    Download No.: 1    Date Format: DD-MM-YY

Historical    Date range: From 01-01-00    To 01-01-00

**TIME HISTORY LOG**

Record No.	Date DD-MM-YY	Time	ENGINE 1					ENGINE 2					NR (%)
			N1 (%)	N2 (%)	TRQ (%)	TOT (°C)	CLP (%)	N1 (%)	N2 (%)	TRQ (%)	TOT (°C)	CLP (%)	
15641	18-04-11	08:42:18Z	77.9	102	19	608	12.67	78.0	102	19	613	12.67	102
15642	18-04-11	08:42:19Z	78.1	102	19	613	13.48	78.2	102	19	618	13.47	101
15643	18-04-11	08:42:20Z	78.2	101	20	615	13.48	78.3	101	20	620	13.47	101
15644	18-04-11	08:42:21Z	78.8	100	23	619	15.47	78.9	100	23	624	15.47	100
15645	18-04-11	08:42:22Z	87.8	98	65	693	15.05	87.9	98	65	698	15.05	98
15646	18-04-11	08:42:23Z	84.2	102	41	716	-1.49	84.5	102	41	720	-1.50	102
15647	18-04-11	08:42:24Z	83.9	101	42	685	-0.96	84.1	101	42	689	-0.96	101
15648	18-04-11	08:42:25Z	84.1	102	43	685	-0.06	84.3	102	44	691	-0.06	102
15649	18-04-11	08:42:26Z	83.1	102	39	675	0.04	83.1	102	38	680	0.05	102
15650	18-04-11	08:42:27Z	82.2	101	36	662	0.12	82.3	101	36	666	0.12	101
15651	18-04-11	08:42:28Z	80.7	100	29	650	0.31	81.7	100	24	653	0.30	100

Displaying mode:  Tabular     Graphical    Graph Options...    Preview    Print    Exit

Figure 5. Engine parameters recorded during the occurrence

## 1.12 Wreckage and impact information

There was no wreckage.

## 1.13 Medical and pathological information

There were no injuries reported.

## 1.14 Fire

There was no fire.

## 1.15 Survival aspects

A shoulder harness was available and the Pilot stated that he had worn it.  
The Incident was survivable.

## 1.16 Test and research

### 1.16.1 Engine Inspection

The engine was sent to the manufacturer's facility for repair following the unscheduled removal due to sudden stoppage/main rotor strike.



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The report produced following the engine inspection and repair<sup>11</sup> indicates that:

*“This airframe was subject to a sudden stoppage of the main rotor head with the result that we had to change all four main rotor blades.”*

*The engine was externally inspected; compressor F.O.D. check and oil filter check were performed. The oil filter and chip detector found clean.*

*The centrifugal impeller revealed minor nicks and erosion on leading edges. Engine was received with the compressor rotor and the power turbine rotor turning freely. Established damage as described above are typical for wear and tear.*

*Therefore the findings cannot be associated with reported Sudden Stoppage event’.*

The engine was repaired, rebuilt and tested in accordance with the OHM and applicable technical instructions.

### **1.16.2 Research publications**

The following publications reviewed:

Dismukes, K., Young, G., & Sumwalt, R. (1999). Cockpit interruptions and distractions: Effective management requires a careful balancing act. *Airline Pilot*, 68(5) 18–21.

Eiff, G. (1999). Organizational safety culture. In R. Jensen (Ed.), *Proceedings of the Tenth International Symposium on Aviation Psychology* (pp. 1–14). Columbus, OH: Department of Aviation.

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## 1.17 Organizational and management information

### 1.18 Additional information

#### 1.18.1 UAE

##### 1.18.1.1 Regulations

The UAE GCAA has promulgated Regulations for the notification and reporting of occurrences, which includes a provision for accident and serious incident notification.

Paragraph CAR-OPS 3.420<sup>12</sup> under the title “*Occurrence reporting*” states that every UAE operator should [... *establish procedures for reporting incidents...*]. In case of an accident or serious incident every UAE operator should establish procedures so that accidents and serious incidents [... *are notified by the quickest means available...*] and then [... *submit a report to the Authority in the State of the operator within 72 hours of the time when the accident or serious incident occurred...*].

<sup>12</sup>CAR-OPS 3, Subpart D, SECTION 1, page 1-D-15, dated 01 September 2010.



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Furthermore, CAR PART IX, under the title Aerodromes Regulations, Appendix 16 applies to heliports<sup>13</sup> that are required to or wish to be certified. In more detail, the regulation states “*The standards and best practice against which the application for a certificate will be assessed are those laid out in ICAO Annex 14, Volumes 1 and 2. The Heliport Manual (ICAO Doc 9261-AN/903) provides expanded guidance on the requirements of ICAO Annex 14, Volume 2*”.

In addition it is stated that “...*specific references which may be useful include:*

- a. *ICAO Aerodrome Design Manual (Doc 9157), Part 4 on Visual Aids, Chapter 14 on Marking and Lighting of Obstacles;*
- b. *ICAO Annex 14 Volume I, Chapter 6 on Visual Aids for Denoting Obstacles;*
- c. *NFPA 418 Standards for Heliports; and*
- d. *ICAO Airport Service Manual (Doc 9137), Part 1 on Rescue & Fire-Fighting”.*

In GCAA CAR-OPS 3.220, under the title “Authorization of Heliports by the Operator” there is a provision for helicopter operators to authorize the use of heliports that are adequate for the type(s) of helicopter and operation(s) concerned along with the operating minima. Moreover, there is an AMC No 1 to OPS 3.220 under the same title, which provides detail information on the Operators’ procedures to utilize various heliports.

The GCAA Air Navigation and Aerodromes Department along with the GCAA Flight Operations Department are currently committed to formulate regulations and extend the safety oversight program. This forms part of the current UAE Prime Minister’s Office Project with the publication of documents scheduled for June 2014 (regulation and guidance material) and the implementation schedule will commence in 2015.

### 1.18.1.2 Actions taken by the UAE Regulator

- a) The UAE GCAA suspended the handling pilot’s license<sup>14</sup> as he did not report the occurrence to the GCAA.
- b) The UAE GCAA instigated a review of the accident and serious incident notification process, after which an easier and more comprehensive notification process, along with a newly established direct telephone line, were established under the project title “Duty Investigator”.

<sup>13</sup> GCAA CAR-PART IX, dated February 2014, defines heliport as an aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

<sup>14</sup> Ref : 22181/DXB-1965/11, dated 9 June 2011.

- c) The UAE GCAA published a Directive, and Information Bulletin, alerting all UAE certificate holders of the new notification process.
- d) The UAE GCAA initiated a “roadshow” which visited all aerodromes and all stakeholders were invited to participate in a briefing regarding the Duty Investigator process.
- e) The UAE GCAA initiated training for all post-holders involved in safety roles.

### 1.18.2 Operator’s Operations Manual Part A

The Operator’s Operations Manual states that in case of an accident or incident the captain <sup>15</sup>should “*complete the Company Accident Report, in addition to complying with the laws and regulations of the country of registration and the country in which the accident or incident occurred. Aircraft accidents and incidents are classified by the company, for reporting purposes, in accordance with the definitions as detailed in this Section. If there is any doubt as to the classification, the occurrence should be reported as an Accident. The Director of Operations will reclassify accidents and incidents where necessary*”.

### 1.18. 3 Extract from P&WC PW207 MM

The helicopter maintenance manual, under the title Main Rotor Sudden Stoppage<sup>16</sup>, states that if the main rotor blades of the helicopter suffer damage after a major collision, which required the replacement of one or more main rotor blades, the Operator must return the engine to an overhaul facility for inspection/repair in accordance with the overhaul manual.

## 1.19 Useful or effective investigation techniques

Normal investigation procedures were used.

## 2. Analysis

This section of the report contains the analysis of the information documented in “1.Factual Information” and which is relevant to the determination of conclusions and causes. The elaboration of this Analysis was conducted taking into account the contributing factors and hypotheses raised. In more detail the following Analysis concentrated on the Operating Pilot, the Other Operational Personnel, who were

<sup>15</sup> Paragraph 11.1.4 Aircraft Accident Reporting in Rotor wing Operations Manual FAS / OMH / 01, issue 2, revision 0, dated 05 January 2008.

<sup>16</sup> P&WC PW207 MPM: p/n 30433322 revision 24, dated 28th Jan 2011.



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made aware of the event, the Operator's Management and the Oversight Authority of the specific Operator, which is the GCAA. The report is, therefore, a technical document which reflects the views and hypothesis result obtained by the Investigation Team regarding the circumstances that contributed or may have contributed to triggering this occurrence.

The document does not focus on quantifying the degree of contribution of the different factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the event.

## 2.1 The Operating Pilot / Accountable Manager

Following the Incident the handling pilot made efforts to conceal the facts by utilizing all available means. He falsely created a need for the helicopter to be transported by road in order to establish a scenario where the transportation company could be wrongly accused of causing damage to the rotor blades. This would allow him to request new rotor blades, without the need to explain what had happened to the previously installed blades.

Taking advantage of the highly secure/remote location, away from other managers, and making use of his managerial position, he was able to manipulate the Operator's system to his benefit. However, the rationale and the reasons supporting his decision to hide the event have to be addressed. In addition, none of the Operator's employees, who were aware of the event, made any effort to notify company's management, notify or report the Incident to the GCAA.

The fear of "loosing face" may have played a large part in the actions of the Pilot following the occurrence. As per Goffman who defined face as "*the positive social value a person effectively claims for himself by the line others assume he has taken during a particular contact*".

It is likely that by hitting the nearby wall while re-positioning the helicopter, the pilot may have thought that he would lose the respect of others, or that he would be humiliated or experience public disgrace, by admitting to be involved in such an Incident. This explanation is worthy of further exploration;

Frequently people, experience a range of interpersonal anger and shame situations that can result in intense emotions.

The available literature shows fear of loss of face to be an important aspect of pilot decision making. When an individual takes on a self-image, expressed through face, he or she will be expected to live up to that image.

The many strategies that can be adopted to save face or to avoid loss of face include:

- Avoiding the initiation of social contacts and seeking the safety of isolation.
- Sacrificing tangible rewards to avoid looking foolish.
- The concealing of anxieties, to avoid being ridiculed or censured.
- In extreme cases, retreating permanently from potential face-losing situations and even committing suicide in some cultures.

The questions that arise are

- a) why do people go to such lengths to avoid loss of face and
- b) what are the dire consequences that can lead to such dramatic behavior?

One way to try to answer these questions is to look at the reactions of people to the experience of or the expectation of loss of face.

As with actions to avoid face-loss, there are many possible reactions:

- One reaction is an uneasy feeling of emotional arousal, such as embarrassment, shame, shyness, anger, anxiety, and self-blame.
- A Study reported the following reactions in a laboratory experiment on loss of face: shame (expressed by 100% of respondents); worry (expressed by 99%); feelings of uneasiness, anxiety, and tension (expressed by 98%); difficulty in concentrating on work (expressed by 72%); and symptoms such as blushing (expressed by 64%).
- Shame, inferiority, embarrassment, and chagrin.
- Retaliation, even at costs to self.
- Withdrawal from public visibility, at costs to self, to avoid looking foolish
- A bargainer will "*cut off his nose to save his face*".

When individuals are made to look foolish, they experience “loss of face”.

Again, in regard to face value, it appears that fear of loss of face fits reasonably closely within the macho attitude<sup>17</sup>. Whereas macho is a positive, active attitude, fear of loss of face is a negative, reactive attitude, which could be seen as the other side of the macho coin. The fear of loss of face is an important concept that needs to be incorporated into pilot decision-making training.

Others suggested<sup>18</sup> defining the Macho: *as this attitude is found in pilots who continually try to prove (or show) themselves (as good as or) better than others. They*

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<sup>17</sup> “Machismo” is usually used in a pejorative way to describe an attitude of male domination and display of power. While this portrayal is clearly recognizable, it does not tell the full story. The Spanish word “macho” simply means male or masculine, and can be used positively to designate one gender’s successful struggle for pride, honor and identity. Machismo is a caricature of these qualities, a brutishness stemming from defensive mechanisms. The thesis of this paper is that the experience of maleness is especially linked to the psychic emotion of shame. Specifically, exaggerated machismo, as the term is usually understood, is the result of frustrated, shameful dependency experiences. In Birmes M. Machismo and Shame. Int Forum Psychoanal 1992;1:163-168. Stockholm. ISSN 0803-706X

<sup>18</sup> Stephen R. Murray (1999) FACE: Fear of Loss of Face and the Five Hazardous Attitudes Concept, The International Journal of Aviation Psychology, 9:4, 403-411, DOI: 10.1207/s15327108ijap0904\_6



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*tend to act overconfident and attempt difficult tasks for the admiration it gains them. When faced with threats to their competence, they are reluctant to accept or admit to their shortcomings by seeking assistance, either within the cockpit from fellow crew members or externally from air traffic control or other aircraft. Their fear of losing face can be carried to the extreme, where it exceeds their fear of loss of life itself.*

The apparent answer for the occurrence pilot involved is that probably his managerial position and status were in question. In this case, it is obvious that he wanted to secure his position and status. As an accountable manager he would have probably thought that by admitting the event he could lose his status among in the perception of other managers, employees and pilots. In addition, his post-holder position might have been at stake. However by deciding to follow his generated scenario, he took far more risks, because if the truth was revealed he would risk not only his status, but everything else.

Although an accountable manager of an operator is the custodian of safety, it is logical to assume that the Incident Pilot may have allowed his personal attitude to predominate his regulatory and company reporting obligations. Since he elected to overlook the Regulations that he was entrusted to follow, he endangered the certificate of the Operator along with running the risk of causing other serious consequences.

## 2.2 Other Operational Personnel

In addition other employees knew about the occurrence, as they were involved in the inspection certified on technical log, which was carried out (a 7 day main rotor blade inspection) and the subsequent disappearance of the rotor blades. Additionally this investigation could not determine the exact date and time that the blades were destroyed. These employees did not come forward and did not report the event to either the General Civil Aviation Authority (GCAA), nor to the Air Accident Investigation Sector.

Other than the employees described in this report, the investigation was unable to determine if any other employees were involved in the attempt to conceal the event and their actions.

## 2.3 Operator's management

When the incident became known, to some of the Operator's Managers, it was immediately reported by the Operator. In addition the Operator's management team made every effort to get to the truth, once these managers suspected that a reportable event had occurred. These managers followed not only the regulations but also industry best practices, came forward and reported the event. They may be



considered the reason this investigation and these improvement opportunities were made possible.

This occurred despite the vigorous denials of the operating pilot.

Therefore it is reasonable to assume that if there were employees and one post-holder prepared to overlook safety regulations, there may be more post-holders, already approved by the GCAA, who may have the same potential attitude.

## 2.4 The General Civil Aviation Authority

However, following this Incident the GCAA has revisited the stringent post-holders approval process and new and demanding training is now mandatory before someone is approved to take up the responsibility of post-holder associated with safety. In addition the post-holders review and approval process was enhanced and became more rigorous. Therefore the GCAA made efforts to ensure that the possibility of reoccurrence was minimized.

The helicopter landing site was a privately owned area and, at the time of the Incident, the GCAA had not published Regulations for the effective and efficient oversight of such areas.

The operation of a heliport is governed by regulation in GCAA CAR Part IX (Aerodromes), Appendix 16 (Heliports), where reference is made to ICAO Annex 14 Volume 2 (Heliports). This regulation applies to heliports where Air Service operations take place and therefore when certification applies.

Safety oversight is provided by GCAA Flight Operations under the provision of GCAA Regulations: CAR Part IV, CAR OPS 3: Operational Regulations (Helicopters) and in more specific CAR-OPS 3.220 Authorization of Heliports by the Operator, which is supported by a detailed AMC.

While the site of the heliport and provision of facilities were not contributory factors in this Incident, extending safety oversight to such locations would be of benefit in raising safety standards.

It would therefore be beneficial to the aviation community in the UAE to ensure that the anticipated regulations and safety oversight are extended to all heliport locations, whether providing an Air Service, or for private use.

A review of the Operator's Operational Manuals revealed that the accident and incident notification process was not clearly stated. Therefore, it is arguable that had there been an explicit policy, guiding all crewmembers to notify the GCAA Air Accident Investigation Sector of a probable serious incident that may have prompted



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the occurrence Pilot to notify his employers and the GCAA by the quickest means available.

Additionally, had the requirement of immediate notification was included in the company's manuals, and had been taught, appropriately practiced and supervised, then, most probably, someone who was aware of the occurrence, would have initiated the notification process. Therefore, the industry would benefit if the GCAA ensures that the notification process is clearly stated in all manuals supporting the UAE certificate holders operations.

The issue of reporting has to be reviewed, as more than one person, apart from the handling Pilot, knew the circumstances of the occurrence. These persons were maintenance and support personnel. Nevertheless none reported or notified neither the GCAA nor the Operator's reporting systems.

Why did professionals, certified, with years of experience in the UAE and abroad, not report the occurrence? By reporting and following all other relevant procedures, they would have prevented the Aircraft from flying again and perhaps endangering other lives, as initially it was believed that the engine had suffered damage.

The issue of "loosing face", in the context of an individual, was examined previously. This subject needs to be examined from an organizational aspect also and the associated organizational culture. Particular reference needs to be attached to the reporting culture of the company and how the organizational culture influences employees.

The turning point for the analysis of organizational factors within commercial aviation accidents came with the National Transportation Safety Board (NTSB) report of the in-flight structural breakup and crash of Continental Express Flight 2574 near Eagle Lake, Texas, on September 11, 1991.

NTSB Board member John Lauber, suggested that the probable cause of this accident included "*the failure of Continental Express management to establish a corporate culture which encouraged and enforced adherence to approved maintenance and quality assurance procedures*"<sup>19</sup>(p. 54). Since then, the focus on organizational factors in aviation and other aerospace accidents has continued to grow, culminating with the analysis of the organizational failures within the National Aeronautic and Space Administration that contributed to the Columbia space shuttle tragedy<sup>20</sup> and the Colgan accident<sup>21</sup>.

<sup>19</sup> National Transportation Safety Board. (1992). Aircraft accident report: Britt Airways, Inc., d/b/a Continental Express Flight 2574, in-flight structural breakup, EMB-120RT, N33701, Eagle Lake, Texas, September 11, 1991 (Rep. No. NTSB/AAR-92/04). Washington, DC: Author.

<sup>20</sup> Columbia Accident Investigation Board. (2003). Report of the Columbia Accident Investigation Board (Vol. 1). National Aeronautics and Space Administration. Washington, DC: Government Printing Office.

<sup>21</sup> National Transportation Safety Board. (2010). Aircraft Accident Report Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407 Bombardier DHC-8-400, N200WQ Clarence Center, New York February 12, 2009 (NTSB Ref: /AAR-10/01)



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Only following significant injury or fatality, including inherent financial loss, does safety become a top focus. Organizations that continually approach safety as a top priority build in adaptability and coping mechanisms that stem from the top level of the organization down to the front-line workers. Organizational and operational susceptibility to failure is therefore, reduced when encountering impending hazards. This is why a focus on organizational safety is so important.

Notwithstanding the vast array of accident causation theories and heightened attention organizational accidents have recently received, little is actually known about the types of organizational factors directly contributing to accidents. In contrast, there is a growing body of knowledge concerning the role air crew error plays in the etiology of aviation accidents, with estimates up to 80% of aviation accidents caused by the unsafe acts of pilots. This discrepancy in understanding organizational factors is not surprising given that a pilot's actions are more easily tied to an accident occurrence, whereas organizational factors are generally far removed temporally from the event, making them difficult to link to an accident during an investigation.

Generally, accidents involving multiple fatalities or significant financial loss have received a more comprehensive investigation than the less severe incidents, in accordance with the relevant international regulations. Moreover, the organizational factors associated with major accidents may not be representative of those involved in the more minor occurrences such as the one under investigation. Nevertheless, resources were allocated in order to at least provide some insight into the factors known to have an impact on operational safety.

Following the rotor blades contact with the building the Incident Pilot handled the situation correctly and avoided any secondary impact with the building or losing control of the aircraft. As he stated he was alone in the helicopter, and he managed to move it away from the building and land safely. The logical question is why the pilot had to taxi away from the helicopter private landing area when it was clearly a safer area to embark his passengers.

Had the helicopter private landing area been certified and an appropriate plan of boarding passengers been present, the occurrence could have been avoided. The GCAA flight operations and GCAA ANA should ensure that all helicopter landing areas have the appropriate safety zones and maneuvering areas clearly defined to minimize the possibility of reoccurrence.

### **3. Conclusions**

#### **3.1 Findings**



- 3.1.1 The Aircraft had a valid Certificate of Airworthiness was certified, insured, equipped and maintained in accordance with existing regulations and approved procedures.
- 3.1.2 The Aircraft was airworthy when dispatched for the flight.
- 3.1.3 The mass and the center of gravity of the Aircraft were within the prescribed limits.
- 3.1.4 There was no evidence of any defect or malfunction in the Aircraft that could have contributed to the Incident.
- 3.1.5 There was no evidence of airframe failure or system malfunction prior to the Incident.
- 3.1.6 The Aircraft was structurally intact prior to impact.
- 3.1.7 All control surfaces were accounted for, and all damage to the Aircraft was attributable to the impact forces.
- 3.1.8 The main rotor blades came in contact with a nearby building wall.
- 3.1.9 The main rotor blades were damaged due to their contact with the nearby building wall.
- 3.1.10 The engine was stopped by the pilot after the contact with the building wall.
- 3.1.11 The flight deck lighting and other electrical services were operating normally.
- 3.1.12 The obsolescent design of the Aircraft's primary flight instruments did not contribute to the loss of situational awareness of the pilot at the time of the occurrence.
- 3.1.13 The pilot was properly licensed, medically fit, qualified and adequately rested to operate the flight, in accordance with existing regulations..
- 3.1.14 The pilot was in compliance with the flight and duty time regulations.
- 3.1.15 There was no evidence that incapacitation or physiological factors affected the pilot's performance
- 3.1.16 There was no evidence that the pilot suffered any sudden illness or incapacity which may have affected his ability to control the Aircraft.
- 3.1.17 Toxicological tests for common drugs and alcohol were not performed.
- 3.1.18 Based on the available reports, there was no evidence to indicate that the pilot's performance was degraded by physiological factors.
- 3.1.19 The occurrence was survivable.
- 3.1.20 There was no post occurrence fire.
- 3.1.21 The available living space remained intact.
- 3.1.22 A shoulder harness was available and the pilot probably wore it.
- 3.1.23 The crew seat remained intact as did the crew restraints/harnesses and support fittings.
- 3.1.24 The pilot was not injured.
- 3.1.25 The wind conditions in which the pilot landed the Aircraft were inside the limits detailed in the Flight Manual and the Operations Manual.
- 3.1.26 The employees who had knowledge of the occurrence did not notify nor reported the occurrence to the GCAA.
- 3.1.27 The employees who had knowledge of the occurrence did not notify nor reported the occurrence to the Operator.
- 3.1.28 The Pilot of the helicopter requested new main rotor blades, to replace the helicopter's main rotor blades, which he claimed were damaged during their removal for transportation.



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- 3.1.29 Neither the helicopter's main rotor blades nor the helicopter itself were intended to be transported to any location.
- 3.1.30 The transportation requirement was falsely manufactured by the Pilot of the Helicopter to cover up the main rotor blades damage.
- 3.1.31 The damaged main rotor blades were not recovered.
- 3.1.32 The Aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR); neither was required by the relevant regulations.
- 3.1.33 The maintenance personnel replaced the damaged main rotor blades with new ones.
- 3.1.34 The Operator's management reported the occurrence to the GCAA 27 days after the occurrence.

### 3.2 Cause

The Helicopter main rotor blades contacted the wall of a building due to distraction of the pilot as he attempted to avoid contact with a foreign object, which had suddenly come into his vision.

## 4. Safety Recommendations

### 4.2 Safety Recommendations General

The below Safety Recommendations are based on the facts and analysis as presented to the Investigation Team and are aimed at eliminating or mitigating the risk(s) brought about by either a latent condition or an active failure. It results from the investigation of an aeronautical occurrence or from a preventative action, and shall never be used for purposes of blame presumption or apportion of civil liability.

Safety Recommendations are made solely for the benefit of the aviation activity operational safety.

Adopting these Safety Recommendations is the responsibility of the holder of the highest executive position in the organization to which the Safety Recommendation is being made.

An addressee must inform the GCAA AAIS, of the preventative action(s) taken or under consideration, within ninety days of the date of the transmittal correspondence.

An addressee, who judges to be unable to comply with a Safety Recommendation must inform GCAA AAIS on the reason(s) why no action will be taken.



The GCAA AAIS shall, within sixty days of the receipt of the reply, inform the addressee whether or not it considers the reply adequate and give justification when it disagrees with the decision to take no action.

#### 4.3 Safety Recommendation made following this investigation

It is recommended to:

the GCAA ANA

SR 07/2014

Should ensure that the anticipated regulations and safety oversight are extended to all heliport locations, whether providing an Air Service or for private use.

the GCAA Flight Operations:

SR 08/2014

should ensure that safety oversight is extended to all heliport locations, whether providing an Air Service or for private use.

SR 09/2014

Should ensure that all Operators' Operations Manuals include a clear notification process in case of an accident or a serious incident.

#### 4.4 Safety Actions Taken

During the course of this investigation the GCAA took the following safety Actions:

- a. The UAE GCAA established a direct telephone line, under the name "Duty Investigator", for the easier notification of accidents and serious incidents.
- b. The UAE GCAA published a Directive, and Information Bulletin, alerting all UAE certificate holders of the new notification process.
- c. The UAE GCAA initiated a "roadshow" which visited all aerodromes and all stakeholders were invited to participate in a briefing regarding the Duty Investigator process.



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- d. The UAE GCAA initiated training for all post-holders involved in safety roles.

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