

# CIAIAC

COMISIÓN DE  
INVESTIGACIÓN  
DE ACCIDENTES  
E INCIDENTES DE  
AVIACIÓN CIVIL

## Second interim Report A-008/2011

Accident involving a Bell 407 helicopter,  
registration EC-KTA, operated by Inaer,  
in Villastar (Teruel) on 19 March 2011



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DE ESPAÑA

MINISTERIO  
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SUBSECRETARÍA

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DE ACCIDENTES E INCIDENTES  
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Edita: Centro de Publicaciones  
Secretaría General Técnica  
Ministerio de Fomento ©

NIPO: 161-13-054-5

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## **Important notice**

This document constitutes the interim statement envisioned in Article 16.7 of Regulation (EU) no. 996/2010 of the European Parliament and of the Council, as well as in paragraph 6.6 of Annex 13 to the Convention on International Civil Aviation. The statement includes the details of the progress of the investigation and the most important operational safety issues revealed to date. The information provided herein is subject to change as the investigation proceeds

Pursuant to the contents of Regulation (EU) no. 96/2010 of the European Parliament and of the Council and of Annex 13 to the Convention on International Civil Aviation, the investigation is purely technical in nature and is not intended to determine or apportion blame or liability. The investigation is being conducted without necessarily resorting to evidentiary procedures and for the sole purpose of preventing future accidents.

Consequently, the use of this information for any purpose other than to prevent future accidents may result in faulty conclusions or interpretations.

## **Abbreviations**

CPL (H)	Commercial Pilot License (Helicopter)
FAA	Federal Aviation Administration
GPS	Global Positioning System
g	Gravity force
K	Knots
S/N	Serial Number
UTC	Coordinated Universal Time

**DATA SUMMARY****LOCATION**

Date and time	<b>Saturday, 19 March 2011, 12:35 UTC<sup>1</sup></b>
Site	<b>Villastar (Teruel, Spain)</b>

**AIRCRAFT**

Registration	<b>EC-KTA</b>
Type and model	<b>Bell 407</b>
Operator	<b>INAER</b>

**Engines**

Type and model	<b>Rolls Royce 250 C47B</b>
Number	<b>1</b>

**CREW**

Pilot in command

Age	<b>38</b>
License	<b>Commercial helicopter pilot CPL (H)</b>
Total flight hours	<b>1665</b>
Flight hours on the type	<b>394</b>

**INJURIES<sup>2</sup>**

	Fatal	Serious	Minor/None
Crew	<b>1</b>		
Passengers	<b>5</b>	<b>1</b>	
Third persons			

**DAMAGE**

Aircraft	<b>Destroyed</b>
Third parties	<b>None</b>

**FLIGHT DATA**

Operation	<b>Aerial work - commercial - firefighting</b>
Phase of flight	<b>En route</b>

**PRELIMINARY REPORT**

Date of approval	<b>21 March 2013</b>
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<sup>1</sup> All times in this report are in UTC. To obtain local time, add one hour to UTC.

<sup>2</sup> As per the Civil Aviation Directorate Resolution of 27 May 2003, which approved Circular Instruction no. 11-23C on limiting the commercial operations of aircraft registered abroad, firefighting crews traveling onboard aircraft are regarded as essential to the completion of the activity at the destination. In this report they are counted as passengers, since they were assumed to have had no duties assigned during the flight.





## 1. BACKGROUND

On the occasion of the first anniversary of the accident involving the Bell 407 helicopter, EC-KTA, on 19 March 2011, the first interim report was published on 30 July 2012, which detailed the status of the investigation. In particular it provided information on the nature and conduct of the flight as well as on the inspections and analyses that were conducted.

The aircraft had taken off from its base in Alcorisa (Teruel) to pick up the members of a firefighting squad and transfer them to the site where a fire had been reported. The helicopter crashed to the ground without any emergency report or declaration being made. Meteorological conditions were ideal for the flight.

Of the seven people onboard – the pilot, five members of the firefighting squad and one forest ranger – six perished in the accident. Only one firefighter survived, with serious injuries.

An on-site investigation and detailed analyses ensued, covering various aspects such as structural inspections, analysis of the flight path, engine inspection, hydraulic system inspection, maintenance condition of the aircraft and pilot qualification.

The results of this work allowed investigators to determine that the left-side hydraulic actuator (S/N HR2036) was fully extended and locked in place. The intermediate mechanism was incorrectly set for proper operation. The laboratory tests confirmed that the improper setting progressed to the point where it prevented the actuator from functioning.

As a direct result of these findings, a series of documents – Service Bulletins, Airworthiness Directives, scheduled inspection requirements – were published after the accident by the relevant departments at Bell Helicopter, Transports Canada and the FAA.

## 2. UPDATED INFORMATION ON THE INVESTIGATION

Following the publication of the first interim report, the investigation continued by analyzing new aspects involving operations and survival aspects. New information was also discovered to complement and provide more details on aspects considered earlier.

### 2.1. Operational actions and procedures

Various working groups were set up in an effort to establish the likely conditions surrounding the flight at the time of the accident. These groups relied on the information gathered, whether provided by the eyewitness account, the fleet tracking flight path and GPS data, the movement of the control surfaces, etc.

The eyewitness account, which helped investigators set an approximate timeline for the start of the emergency, and a detailed study of the data taken from the fleet tracking system and the portable Garmin GPS unit, indicate that when the controls first started to feel sluggish the pilot reduced speed to around 100 kt, with the final segment of the flight path indicating that he was going to attempt a rolling landing. Furthermore, as discovered in the wreckage, the HYD SYS switch was OFF. All of this indicates that the aircraft was making an emergency landing due to a failure of the hydraulic system, as described in the relevant section in the Flight Manual.

### **2.2. Survival factors**

The results of the autopsies conducted on the victims indicate that they all died from impact trauma. In the case of the pilot, the results of the toxicological analysis were negative, meaning there is no reason to suspect his abilities were impaired or diminished. All of the helicopter's occupants had their safety harnesses fastened at the time of the accident.

The injuries described in the post-mortem reports are consistent with a strong impact. There is an acceptable correlation between the injuries caused, and regarded as fatal, and the deceleration vectors generated by the force of the impact with the ground.

It is estimated that considering the impact speed, flight path and the resulting injuries, an acceleration force of up to 50 g's could have been generated.

Also, although the cabin itself largely retained its structural integrity, there is agreement between the position of each of the occupants and the injuries produced against the areas of impact inside the cabin.

With regard to the integrity of the components in the cabin, an analysis was conducted of the fracture process for a support for two of the seatbelts in the back row of seats. This revealed that the material responded normally during the application of the overload, with significant plastic deformation resulting in a fracture of a primarily ductile nature.

A traceability analysis was also conducted on the servo prior to its installation on the accident helicopter.

## **3. STATUS OF THE INVESTIGATION**

The investigation has been concluded and the final report is in the process of being written. Once the process specified in the applicable regulation is completed, the report will be published.