

CIAIAC

COMISIÓN DE
INVESTIGACIÓN
DE **A**CCIDENTES
E **I**NCIDENTES DE
AVIACIÓN **C**IVIL

Interim Statement A-008/2011

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



GOBIERNO
DE ESPAÑA

MINISTERIO
DE FOMENTO

Interim Statement

A-008/2011

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



GOBIERNO
DE ESPAÑA

MINISTERIO
DE FOMENTO

SUBSECRETARÍA

COMISIÓN DE INVESTIGACIÓN
DE ACCIDENTES E INCIDENTES
DE AVIACIÓN CIVIL

Edita: Centro de Publicaciones
Secretaría General Técnica
Ministerio de Fomento ©

NIPO: 161-12-056-1

Diseño y maquetación: Phoenix comunicación gráfica, S. L.

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63
Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es
<http://www.ciaiac.es>

C/ Fruela, 6
28011 Madrid (España)

Foreword

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

AD	Airworthiness Directive
CIAIAC	Comisión de Investigación de Accidentes e Incidentes de Aviación Civil
h	Hour(s)
GPS	Global Positioning System
S/N	Serial Number
UTC	Universal Time Coordinated

DATA SUMMARY

LOCATION

Date and time	Saturday, 19 March 2011; 12:35 UTC ¹
Site	Villastar (Teruel)

AIRCRAFT

Registration	EC-KTA
Type and model	BELL 407
Operator	Inaer

Engines

Type and model	ROLLS ROYCE 250 C47B
Number	1

CREW

Pilot in command

Age	38 years old
Licence	Commercial helicopter pilot
Total flight hours	1,665 h
Flight hours on the type	394 h

INJURIES²

	Fatal	Serious	Minor/None
Crew	1		
Passengers	5	1	
Third persons			

DAMAGE

Aircraft	Destroyed
Third parties	None

FLIGHT DATA

Operation	Aerial work – Commercial – Firefighting
Phase of flight	En route

INTERIM STATEMENT

Date of approval	3rd May 2012
------------------	--------------

¹ All times in this report are in UTC. To obtain local time, add one hour to UTC.

² According to the Directorate General of Civil Aviation's Resolution of 27 May 2003 which approved Instruction Circular no. 11-23C on limiting the commercial operations of foreign registered aircraft, firefighting crews traveling onboard aircraft are regarded as essential to the performance of the activity at the destination. In this report they are categorized as passengers since they did not have any duties to perform onboard.

1. SUMMARY OF ACCIDENT

On Saturday, 19 March 2011, a Bell 407 helicopter, registration EC-KTA and operated by INAER, took off from its base in Alcorisa (Teruel) at 12:09:34 on the first flight of the day, the purpose of which was to pick up the members of a firefighting team that was clearing a burned patch of land on Mt. Los Olmos, near the town of Alcorisa, and transfer them to the site of a fire that had broken out between the towns of Villed and Cascante. The helicopter was airborne and en route to the fire with the team onboard in only three minutes.

Weather conditions were perfect for the flight.

At around 12:30, according to the Provincial Fire Coordinator of the Government of Aragon's Board of Agriculture, Livestock and the Environment, the helicopter reported being above the town of Cedrillas with the fire in sight. Minutes later, and without any emergency notification or declaration being made by the pilot, the helicopter impacted the ground.

The impact took place in flat, open terrain that was free from obstacles. The helicopter was found on its left side and there were clear signs that it had been moving laterally to the left at the time of impact.

Of the seven occupants—the pilot, the five members of the firefighting team and a forest ranger—six perished in the accident. The only survivor was a firefighter, who was seriously injured.

2. INVESTIGATION

The helicopter wreckage was recovered after the accident and kept in a hangar under CIAIAC custody. The wreckage was submitted to a thorough structural inspection, which confirmed the violent lateral impact. The structural damage to the cockpit was consistent with the impact.

The position, altitude, speed and heading data provided by the GPS equipment installed on the helicopter, as well as from a handheld GPS unit also onboard the aircraft, indicate that the flight was uneventful until just before the impact.

The direct observation during the field investigation of the hydraulic system switch, in OFF position, and the subsequent statements from the only survivor concerning the difficulties and efforts made by the pilot trying to control the aircraft led to an initial check of the hydraulic system operation, the results of which proved the necessity of a deeper inspection in the manufacturer's facilities.

The engine was also subjected to a detailed inspection. A functional test revealed that the engine was in good operating condition until the impact with the ground.

As regards the maintenance status of the aircraft, investigators confirmed that the scheduled maintenance had been performed and there were no malfunctions or deferred maintenance items at the time of the accident.

The pilot was properly qualified and had a valid license, rating and medical certificate. His experience as a firefighting pilot dated back to 2008.

2.1. Analysis of the hydraulic system. Inspections and tests

The hydraulic system on the aircraft has four hydraulic actuators that, though identical, serve different purposes:

- One directional control actuator located in the tailcone of the aircraft and operated from the cockpit via pedals in the pilot's seat. Used to control the pitch of the tail rotor.
- One collective pitch control actuator located above the cockpit, near the main rotor shaft and operated via the collective lever. Used to control the pitch of the main rotor blades.
- Two additional actuators located on either side of the collective pitch control actuator and operated via the cyclic stick and which are operated in tandem to alter the position of the plane of rotation of the main rotor.

Inside each hydraulic actuator there is a piston that moves longitudinally within the main body of the actuator.

The piston must move at the speed required by the pilot when he moves the controls. To this end, there is a linkage between the controls and the piston that relays the control inputs to the hydraulic actuator.

The length of travel of this linkage is determined by the range of inputs that the pilot can apply to the flight controls. When an actuator is installed, the lengths of travel of the flight controls and the linkage must be verified to be consistent. This length of travel is then locked in to ensure the system remains fully operational. Any variation in this adjustment could result in piston movements that are not in keeping with the pilot's inputs.

Service Bulletin 407-05-70 of 10 November 2005, issued by Bell Helicopter Textron, established the requirement to inspect this adjustment for possible loosening caused by an improperly installed lock washer.

The operation of the aircraft's hydraulic system was subjected to a detailed inspection, the findings of which are shown below:

- The analysis of the hydraulic liquid did not reveal any abnormalities in its composition.
- The hoses and pipes in the hydraulic system were found to be free from blockages.
- The hydraulic actuator associated with the collective pitch control (S/N HR 2539) and the one located to its right (S/N HR 2588), as seen from behind, worked properly.
- The left hydraulic actuator (S/N HR 2036), as seen from behind, was fully extended and could not be moved. The linkage was adjusted such that it prevented the proper operation of the actuator. Laboratory tests confirmed that the improper adjustment continued to drift until it rendered the actuator inoperable.

Subsequent to the inspection of the hydraulic system carried out during the investigation, the civil aviation authority of the State of design of the helicopter, Transport Canada, issued Airworthiness Directive no. CF-2011-17 of 30 June 2011, which indicated the need to conduct an inspection to check the actuator control system for proper adjustment, after a fault was found during the quality control of a product supplied to Bell Helicopter. This directive went into effect on the date of its publication and required compliance before the next flight. FAA issued on 8 July 2011 an Airworthiness Directive in this same way, AD 2011-15-51, where it is also required an inspection to check the status of the actuators.

On 22 February 2012, Bell Helicopter informed the owners and operators of the 407 model helicopters of the expanded requirements for the 12- and 24-month scheduled maintenance inspections. These new requirements include inspecting the servo actuators.

2.2. Survival aspects

The preliminary results of the autopsies of the victims indicate that they all died from trauma produced during the impact. In the case of the pilot, there is nothing to indicate that his faculties were impaired or diminished. All of the occupants were wearing their safety harnesses at the time of the accident.

The investigation is analyzing the link between the injuries sustained and regarded as fatal and the deceleration vectors generated by the force of the impact with the ground.

3. STATUS OF THE INVESTIGATION

The investigation is analyzing the operating actions and procedures involved in a hydraulic system failure. Once concluded, a final report will be issued.

