

CIAIAC

COMISIÓN DE
INVESTIGACIÓN
DE ACCIDENTES
E INCIDENTES DE
AVIACIÓN CIVIL

Report ULM IN-006/2018

Incident involving a FLIGHT
DESIGN CT2KL aircraft,
registration EC-DX3, in the
municipality of Torre Pacheco
(Murcia, Spain) on 6 March 2018



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DE ESPAÑA

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SUBSECRETARÍA

COMISIÓN DE INVESTIGACIÓN
DE ACCIDENTES E INCIDENTES
DE AVIACIÓN CIVIL

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Foreword

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances of the accident object of the investigation, and its probable causes and consequences.

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.5 of Regulation (UE) n° 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1., 4. and 21.2 of Regulation 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report was originally issued in Spanish. This English translation is provided for information purposes only.

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Abbreviations

AESA	Spanish Aviation Safety Agency
GPS	Global Positioning System
Kg	Kilograms
Kg/cm ²	Kilograms per cm ²
Km	Kilometers
Km/h	Kilometers per hour
L	Liters
M	Meters
RPM	Revolutions per minute
TULM	Ultralight aircraft pilot license
UTC	Universal time coordinated
VFR	Visual Flight Rules

Synopsis

Owner and Operator:	Private
Aircraft:	FLIGHT DESIGN CT2K, registration EC-DX3
Date and time of incident:	6 March 2018 at 18:50 (local time ¹)
Site of incident:	Torre-Pacheco (Murcia, Spain)
Persons on board:	One (not injured)
Flight rules:	VFR
Type of flight:	General aviation. Private. En route. Cruise
Date of approval:	25 April 2018

Summary of event:

On Tuesday, 6 March, a FLIGHT DESIGN CT2K powered ultralight aircraft, registration EC-DX3, took off from the Los Garranchos aerodrome (Murcia) to go on a local flight with the pilot as the sole occupant.

Seconds after taking off, the pilot felt the engine RPM fall and upon realizing that the malfunction persisted, he decided to make an emergency landing on the RM-19 highway.

He eventually landed near kilometer marker 14, with the aircraft stopping on the shoulder with the wings parallel to the traffic lanes.

The pilot was not injured and the aircraft was not damaged.

The investigation has determined that the incident was caused by the execution of an emergency off-field landing due to a malfunction in the engine caused by excess water in the fuel lines, resulting from not draining the tanks.

¹ Unless otherwise specified, all times in this report are local To obtain UTC, subtract one hour.

1. FACTUAL INFORMATION

1.1. History of the flight

On Tuesday, 6 March, a FLIGHT DESIGN CT2K powered ultralight aircraft, registration EC-DX3, took off from the Los Garranchos aerodrome (Murcia) at 18:45 to go on a local, short-duration flight. The pilot was the sole occupant.

The day before, the carburetors had been installed in the engine but there was no time to do a test flight before sunset, so on the day of the incident the test flight was performed to verify that everything was working correctly.

According to information provided by the pilot, 3 minutes after taking off, he felt a drop in the engine RPM, which did not rise above 1800 RPM. The engine was also bucking, so he looked for a suitable field in which to land.

Upon realizing there was no field in good condition in the vicinity and that there were power lines at all of them, he decided to make an emergency landing on the RM-19 highway (the Mar Menor Highway).

According to his statement, he descended quickly, kept the aircraft 2 m above the ground at a speed of 150 km/h and landed in the direction of traffic flow, using the continuous line on the right side, which separates the road from the shoulder, as a reference for centering the aircraft, which was left on the shoulder during the course on the ground while braking. Seconds before touching down on the road, the engine stopped.

He landed near kilometer marker 14, near the town of Balsicas, in the municipality of Torre Pacheco.

The pilot was not injured and the aircraft sustained no damage. After the airplane stopped, and with the help of someone who was nearby, he left it on the shoulder and it turned it 90° to the left pushing the horizontal stabilizer, so that it stayed with the wings parallel to the road and thus prevent it from invading it.

None of the people in the cars driving in the area were injured, nor were any of the vehicles driving on the highway damaged.



Figure 1. Aircraft on the shoulder after landing

1.2. Injuries to persons

The pilot was not injured.

1.3. Damage to aircraft

The aircraft was not damaged.

1.4. Other damage

There was no other damage.

1.5. Personnel information

The 41-year old pilot had an ultralight pilot license (TULM) issued by Spain's National Aviation Safety Agency on 27 December 2012, and the associated class-II medical certificate, both of which were valid.

He had a total of 225:30 flight hours, of which 189:30 had been on the type.

1.6. Aircraft information

The FLIGHT DESIGN CT2K powered ultralight aircraft, registration EC-DX3, was manufactured in 2003 and had serial number 02-01-01-AR. It is a single-engine, two-seater aircraft made with composite materials with one three-blade propeller.

This airplane is 2.15-m high, 6.22-m long and has a wingspan of 8.50 m. Its empty weight is 295 kg and its maximum takeoff weight is 450 kg.

It had a ROTAX 912 ULS engine installed, serial number 4427566.

Its maximum fuel capacity is 126 l, of which 120 l is usable.

It had a valid restricted airworthiness review certificate issued by the National Aviation Safety Agency (AESA) on 19 January 2004.

The last maintenance check of the airframe had been performed three months earlier, with 725:30 h on the aircraft. It was a 100-h check. The last inspection of the engine, a 100-h check of the engine and 200-h check of the carburetors, which had been replaced, had been conducted the day before the incident, with 804 h on the aircraft.



Figure 2. Photograph of the aircraft

1.7. Meteorological information

Conditions were good for the visual flight.

1.8. Aids to navigation

Not applicable to this event.

1.9. Communications

Not applicable to this event.

1.10. Aerodrome information

Not applicable to this event.

1.11. Flight recorders

The aircraft did not have flight recorders, as they were not required by regulations.

However, the flight was recorded on a global positioning system (GPS) device that was carried on board.



Figure 3. Aircraft flight path

1.12. Wreckage and impact information

The aircraft came to a stop at kilometer marker 14 on the RM-19 highway. Its wings were parallel to the highway and did not impede traffic.

Shortly after landing, the airplane was towed away by a crane, which left it in a nearby plot. The wings were not removed.

Two days later, the engine was inspected at the location where the aircraft has been left, the results of which are provided below:

- Both the aircraft and the engine were in good overall condition.
- All of the spark plugs were in good condition.
- The magnetic plug was also in good condition and had no particles.
- The compression was verified to be good in all four cylinders by moving the propeller. The engine was then started and measured with a gauge, yielding normal values (11.5 Kg/cm² in #1, 10.5 Kg/cm² in #2, 10.1 Kg/cm² in #3 and 10.5 Kg/cm² in #4)
- The carburetors were removed. They looked new, which is consistent with the information provided that indicated that they had been installed the previous day. The floats in the left carburetor were in good condition and the jet was not plugged. There was a water bubble in the tray. The right carburetor had the same appearance. Practically all the liquid that had gathered in the tray was water.



Figure 4. Left carburetor



Figure 5. Right carburetor

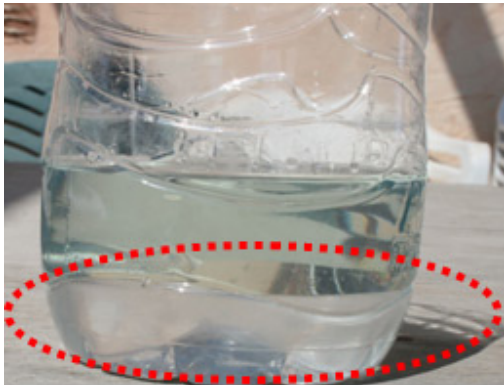


Figure 6. Water in the fuel

- There was also water in the gascolator filter.
- Almost all the fuel that was in the wings, approximately 10 l, was removed. There was also a large amount of water inside, as shown in the photograph in Figure 6.

1.13. Medical and pathological information

Not applicable to this event.

1.14. Fire

There was no fire.

1.15. Survival aspects

Not applicable to this event.

1.16. Tests and research

No special tests or research were required.

1.17. Organizational and management information

The aircraft was owned by three individuals, one of whom was the pilot.

1.18. Additional information

In his interview, the pilot stated that he had taken off without first purging the fuel system, and that the aircraft had been parked for a while with little fuel in the tanks.

1.19. Useful or effective investigation techniques

No special investigation techniques were employed.

2. ANALYSIS

After inspecting the engine and its components, it seems clear that the cause of the engine failure was the large amount of water in the fuel system (tanks, carburetor trays and the gascolator filter), which prevented the fuel from reaching the carburetors normally.

The tanks should not be left with low fuel in them for long periods of time so as to prevent water from building up in the fuel system. This precaution is always applicable, but more so in areas with high humidity, such as locations near the coast, as in this case.

The amount of unusable gasoline was 6 l, and when the tanks were emptied, around 10 l was gathered, this amount being very close to the unusable amount. In these conditions, the likelihood that there was water in the tanks was very high.

In addition to the above, before any flight, the water in the system has to be drained, meaning the water inside the tanks has to be removed so that when the engine is started and fuel is drawn into it, there is no water in the lines, which could keep fuel from reaching the carburetors.

Since water is denser than gasoline, it sinks to the bottom of the tank. When it is drained, a small orifice is opened at the bottom of the tank that empties the contents of the tank to a transparent sample cup to see if there is any water in the liquid that was drained.

The drained liquid is discarded until it is verified not to contain any water. This is the first step in the pre-flight inspection.

In this case, the system was not drained of the water it contained, which caused the engine to malfunction practically right after takeoff, and the eventual stoppage of the engine in the final seconds before landing.

After the engine stopped supplying the power required, the pilot decided to land as soon as possible, so he tried to find a suitable field, as he himself stated. He could not find one where he could be sure to make a safe landing, so he opted to land on a nearby highway.

Independently of how the situation may have looked to the pilot from the air, we must consider that he was very familiar with the area and knew that fields in the vicinity, despite looking suitable from a distance, were in fact not good for landing because they were plowed and had large furrows. Not only that, but he was

worried about striking one of the many power lines that crossed nearly every field.

However, landing on a road with vehicle traffic on it cannot be recommended nor is it considered a good practice, not even as a suitable alternative to finding an adequate field when forced to make an off-field landing due to an engine stoppage. This is not the first time this kind of landing has been performed, but the risk taken is very high, even if the road is wide and has more than one lane of travel in each direction, as in the case of highways.

When the engine stoppage and the subsequent landing occurred, the traffic intensity² and density³ on the highway were low. This, along with the fact that the landing was made in the direction of traffic, facilitated the pilot's maneuver and contributed to the absence of any collisions.

2 Traffic intensity is the number of vehicles that pass through a fixed length of road per unit time.

3 Traffic density is the number of vehicles present in a segment of road per unit length at a given time.

3. CONCLUSIONS

3.1. Findings

- There were no maintenance problems with the aircraft or engine.
- The aircraft's documentation was in order.
- The aircraft was checked the day before, when the carburetors were installed.
- The pilot did not drain the fuel tanks.
- Shortly after takeoff, the engine stopped supplying power.
- The pilot looked for a field on which to make an emergency landing and when he was unable to find one that looked suitable, he opted to land on a nearby highway.
- He landed in the right lane in the direction of traffic flow.
- There were no injuries or material damage.
- A check of the engine after the incident revealed a large amount of water in the fuel tanks, carburetor trays and gascolator filter.

3.2. Causes/Contributing factors

The incident was caused by the execution of an emergency off-field landing due to a malfunction in the engine caused by excess water in the fuel lines, resulting from not draining the tanks.

4. RECOMMENDATIONS

None