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## Report A-022/2015

Accident involving a WSK PZL-M18B  
aircraft, registration EC-FAT, operated  
by SAETA, at the Doade aerodrome  
(Lugo) on 15 July 2015



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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**

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° ' "	Sexagesimal degrees, minutes and seconds
°C	Degrees centigrade
AEMET	Spain's National Weather Agency
AESA	Spain's National Aviation Safety Agency
Am	Ante meridiem
CAMO	Continuing Airworthiness Maintenance Organization
CAVOK	Ceiling and visibility OK
CPL (A)	Commercial pilot license
CV	Curriculum Vitae
ECAE	Evaluation for Aviation Communications in Spanish
EU	European Union
FCL	Flight Crew Licenses
FI	Flight Instructor
hr	Hours
hPa	Hectopascals
ICAO	International Civil Aviation Organization
Kg	Kilograms
Km	Kilometers
Km/h	Kilometers/hour
Min	Minutes
N	North
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
SAETA	Servicios Aéreos Europeos y Tratamientos Agrícolas, S. L.
SB	Service Bulletin
SEP(L)	Single Engine Piston (Land) rating
VFR	Visual flight rules
W	West



## Synopsis

Owner:	Martínez Ridao Aviación, S.L. <sup>1</sup>
Operator:	Servicios Aéreos Europeos y Tratamientos Agrícolas, S. L. (SAETA)
Aircraft:	WSK PZL-M18B <sup>2</sup> , registration EC-FAT
Date and time of accident:	15 July 2015 at 14:16 <sup>3</sup>
Site of accident:	Forest firefighting base in Doade (Lugo)
Persons onboard:	1, uninjured
Type of flight:	Aerial Work – Commercial – Firefighting
Phase of flight:	Takeoff – Takeoff run
Date of approval:	31 may 2016

### Summary of the event

On Wednesday, 15 July 2015 at approximately 14:16, a single-engine WSK PZL-M18B aircraft, registration EC-FAT, suffered a runway excursion during its takeoff run at the forest firefighting base in Doade (Lugo), colliding into the perimeter fence that protects the runway and then crashing into the surrounding terrain.

The aircraft had been mobilized to fight a fire in the vicinity. It was the first flight of the day.

The pilot onboard the aircraft was uninjured. The aircraft sustained damage to its landing gear, wings and propeller.

The investigation has determined that this accident was likely caused by the pilot's lost control of the aircraft.

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<sup>1</sup> The companies Martínez Ridao Aviación S.L. and SAETA both belong to the same owner but are distinct and independent entities. They are both air operators and maintenance organizations. According to the registration certificate, aircraft EC-FAT is owned by Martínez Ridao Aviación S.L. On the day of the accident, the aircraft was being operated by SAETA.

<sup>2</sup> The aircraft, originally a WSK PZL-M18A, was converted into an M18B by Service Bulletin SB E/02.158/96.

<sup>3</sup> All times in this report are local.



## 1. FACTUAL INFORMATION

### 1.1. History of the flight

On Wednesday, 15 July 2015 at approximately 14:16, a single-engine WSK PZL-M18B aircraft, registration EC-FAT, which had been mobilized to fight a fire in the vicinity of the Doade forest firefighting base in Lugo, was preparing to make its first flight of the day.

According to the pilot's statement, during the takeoff run he noticed that the aircraft was shifted left of the runway centerline<sup>4</sup>. He proceeded to correct the deviation, but due to the inertia of the airplane, it continued moving to the left. Finding it was impossible to correct the deviation, he applied the right brake and reduced power to abort the takeoff maneuver. It was not possible to brake the airplane inside the runway, and it departed the runway via the left side, colliding against the fence protecting the runway and then crashing into the surrounding terrain.

The pilot was not injured.

The aircraft sustained damage to its landing gear, wings and propeller.

### 1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Other
Fatal				
Serious				
Minor				N/A
None	1		1	N/A
TOTAL	1		1	

### 1.3. Damage to aircraft

As the figure 1 shows, the aircraft sustained significant damage to all four propeller blades, which, though not twisted, were bent backwards. The damage was such that the propeller had to be replaced.

As for the engine, it had to be overhauled. The oil filter and its support frame were also fractured and had to be replaced.

<sup>4</sup> The runway centerline at the Doade (Lugo) forest firefighting base is not marked.



Fig. 1. EC-FAT. Damaged propelier

On the right wing, the leading edge exhibited several dents and loss of material at the junction of the right wing and the center wing, as shown in figure 2.

The right wing also had a dent at the tip, and part of the trailing edge on the wingtip was bent.

On the left wing there was a dent on the wingtip and several smaller dents on the leading edge. One of the landing lights was broken. The figure 3 shows the damage to the left wing.



Fig. 2. EC-FAT. Damage to the right wing



Fig. 3. EC-FAT. Damage to the left wing

Both wingtips and landing lights were replaced after the accident.

In addition, the right main gear was fractured approximately 1 meter away from its root in the wing. After the accident the owner completely replaced both main gears.

#### 1.4. Other damage

There was no additional damage of any kind, except for that to the perimeter fence that protects the runway at the Doade forest firefighting base.

### 1.5. Personnel information

The pilot, a 50-year old Polish national, had a commercial pilot license (CPL(A)) issued by the Polish Civil Aviation Authority, and a single-engine piston land rating (SEP(L)), valid until 31 October 2016. He also had a CPL flight instructor (FI) rating that was valid until 26 October 2015. The pilot license had been issued as per Part-FCL of Regulation (EU) no. 1178/2011 of the Commission of 3 November 2011, and was therefore valid for flying in Spain.

He also had several medical certificates, including a Class 1<sup>5</sup> medical certificate, which was valid until 17 June 2016.

The pilot had been certified to have an ICAO level 4 (Spanish) on 28 April 2015 after taking the ECAE exam (Evaluation for Aviation Communications in Spanish) at SENASA, a Language Skill Evaluation Center that is certified by AESA.

In addition, the operator, in this case SAETA, S.L., had issued him a competency certificate pursuant to Royal Decree 750/2014 of 5 September on 26 June 2015. The competency certificate allowed him to engage in surveillance and patrol duties and to release water from an airplane as part of firefighting activities.

On the day of the accident he had a total of 2,450 flight hours, 1,170 of which had been on the type. Moreover, he had been taking part in firefighting campaigns since 1997. Specifically, and according to the CV provided, from 1997 to 2006 he had been employed at EADS PZL WARSZAWA Okecie S.A, from 2007 to 2012 at FLY POLSKA and from 2006 to 2015 he had worked for Martinez Riado as a firefighting pilot.

### 1.6. Aircraft information

The WSK PZL-M18B aircraft, registration EC-FAT and serial number 1Z022-03, was outfitted with a PZL KALISZ ASZ-62-M18 engine. On 16 October 2008, the aircraft, originally a PZL-M18A, was converted into a PZL-M18B by Service Bulletin E/02.158/96.

The aircraft had a certificate of airworthiness that restricted it to “agricultural spraying and firefighting only”. The airworthiness review certificate had been extended on 23 March 2015 and was valid until 26 February 2016.

The last inspection of the aircraft was carried out on 16 March 2015. It was an annual/100-hour inspection. At the time the airplane had 2,072:20 hours. The last flight before the accident flight had been on 13 July 2015, with 2,075:40 hours on the airplane, according to the entry in its log book.

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<sup>5</sup> Other commercial operations.



The last engine inspection was conducted on 16 March 2015. It was a 300-hour inspection. At the time the engine had 1,847:35 hours. Before the accident flight, the engine log book showed that the last flight had been on 13 July 2015, with 1,850:55 hours on the engine.

The operator had a Maintenance Program that had been approved by AESA on 22 February 2011. Subsequently, on 4 May 2015, the Martínez Ridao Aviación ES.MG.106 CAMO indirectly approved the Revision to the Maintenance Program, which was reported to AESA for its approval.

### **1.7. Meteorological information**

Spain's National Weather Agency (AEMET) does not have weather data for the Doade forest firefighting airbase. However, by using data from the automatic station in Ourense, 25 km away from Doade, along with satellite and radar images and adverse weather warnings, the most likely conditions at the site of the accident were determined to be as follows:

Wind from the northwest, from about 300°, at 8 km/h and gusting to 14 km/h. Visibility on the surface was good. The skies were clear or mostly clear. The temperature was 28° C, the relative humidity 54% and the pressure (QNH) 1,016 hPa. Furthermore, there was no significant precipitation or adverse weather warnings on the day of the accident.

In addition, based on the report of the event provided by the pilot, weather conditions were CAVOK (ceiling and visibility OK) at the forest firefighting base at the time of the accident.

### **1.8. Aids to navigation**

The pilot did not use any aids to navigation.

### **1.9. Communications**

There were no communications.

### **1.10. Aerodrome information**

The forest firefighting base of Doade is located in the municipality of Sober, part of the VII Terra de Lemos district in Lugo. It is at coordinates 42° 26' 02" N and 07° 29' 08" W, at an elevation of 580 meters (1903 feet).

The base at Doade is for ground-loaded airplanes.

The runway is 900 meters long and 30 meters wide. The runway surface is asphalt in one segment and dirt in another. It does not have lighting. The runway orientation is 08/26.



Fig. 4. Runway at the Doade forest firefighting base

### **1.11. Flight recorders**

Not applicable.

### **1.12. Wreckage and impact information**

The aircraft experienced a runway excursion during its takeoff run at the Doade (Lugo) forest firefighting base. The runway excursion took place in the asphalted segment of the runway after the aircraft had traveled about 300 meters. The aircraft broke through a perimeter fence protecting the runway and came to a stop to one side of the runway, with the nose facing the runway.

The two diagrams below show the aircraft's path on the ground. The second diagram is a close-up of the first. According to information provided by the operator, the aircraft traveled a total of about 300 meters before departing the runway. The pilot started correcting for the deviation toward the left after 80 meters.

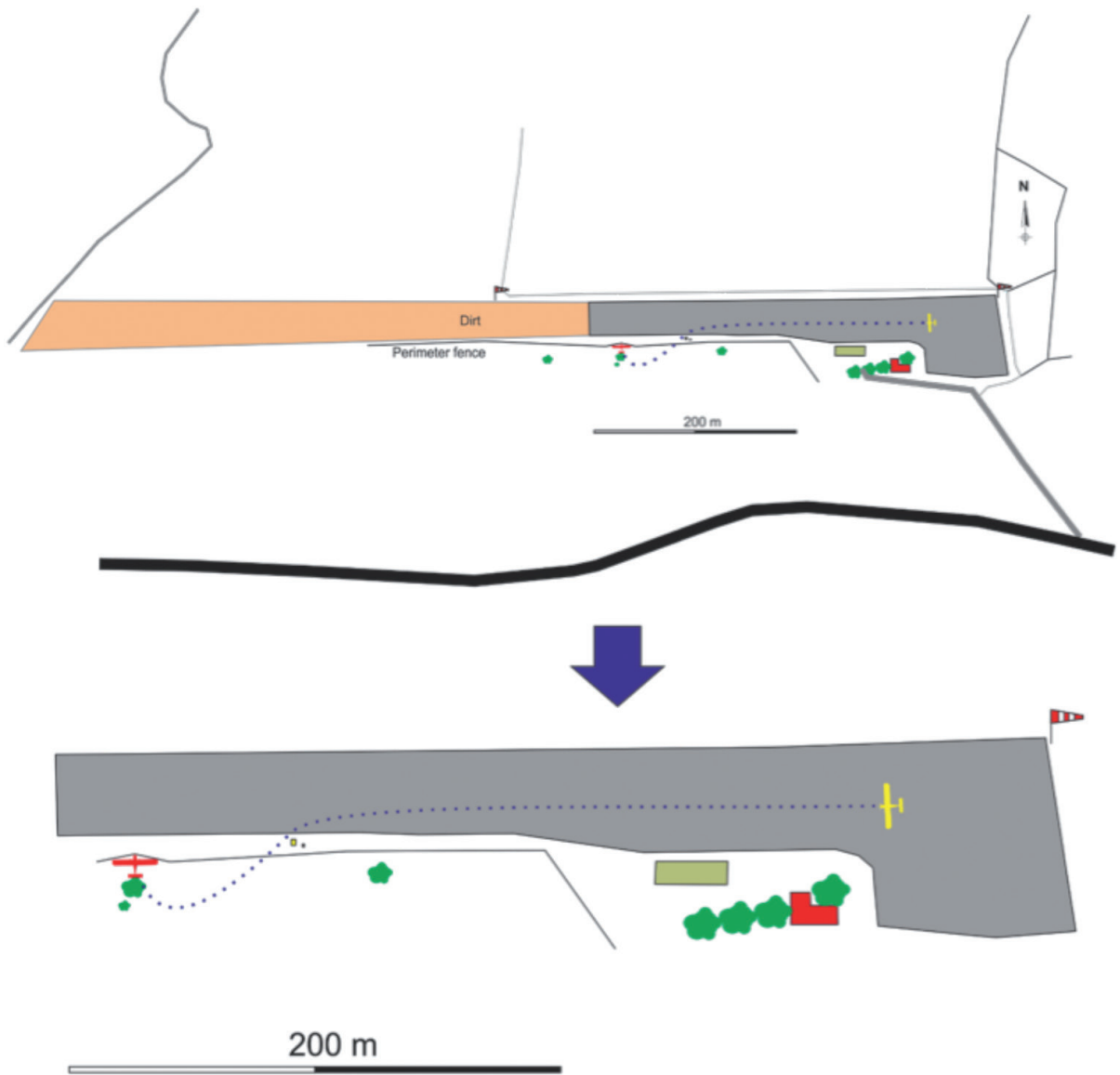


Fig. 5. Diagrams of aircraft's path on the ground

The photograph below shows the final position of the aircraft relative to the runway.



Fig. 6. Orientation of the aircraft with respect to the runway

As a result of the runway excursion, of the fact that it broke through the perimeter fence protecting the runway and that it crashed into the surrounding terrain, the aircraft sustained damage to the engine, both wings and landing gear

The following damage was sustained by the aircraft during the accident:

- The four propeller blades were bent backwards, with no apparent twisting.
- The oil filter and its support bracket were both broken.
- The left and right wings were dented. In addition, the right wing also experienced a loss of material, and on the left wing part of the trailing edge was bent at the wingtip.
- Part of the right main gear was broken.

### **1.13. Medical and pathological information**

Not applicable.

### **1.14. Fire**

There was no fire in or around the aircraft. Following the accident, a fire truck applied foam to prevent a possible fire.

## 1.15. Survival aspects

Not applicable.

## 1.16. Tests and research

### 1.16.1. Pilot's statement

The pilot stated that during the takeoff run, he was left of the runway centerline and upon noticing that the airplane was moving left, he proceeded to correct the deviation. Seeing that the airplane did not react, he applied the right brake and reduced power in an attempt to abort the takeoff maneuver. Despite these efforts, the airplane departed the runway.

The left wing collided with the runway security fence, after which the airplane crashed against the ground surrounding the Doade base. The impact with the berm broke the main gear. The aircraft came to a stop approximately perpendicular to the runway centerline and facing the runway. The damage to the aircraft occurred as it traveled over the terrain surrounding the runway.

When the accident took place, visibility was good, in the pilot's opinion. The sky was clear and the runway was visible enough to fly the airplane. Moreover, he stated that from inside the airplane he could not feel a crosswind during the takeoff run. Since the Doade base is located between mountains, the wind is highly variable and it could have contributed to the runway excursion, though the pilot did not consider that very likely.

He stated that he had been at the Doade base since 1 July taking part in the current firefighting campaign, that he had experience operating at the Doade base and that he knows the characteristics of its runway well. In his opinion, the runway does not seem to have an appreciable gradient in either direction. On the day of the accident the runway was dry, clean and free from contamination.

From 10 am onward, pilots have to be ready to take part in firefighting duties if required. Therefore, on the day of the accident, he had arrived at the Doade base before 10 am, as usual, to prepare the airplane, do the pre-flight checks, consult the weather online, etc.

The pilot stated that the airplane had been loaded with 1700 kg of water, which was normal, and that it also had between 600 and 750 liters of fuel. The pilot further noted that due to the airplane's high weight and the large amount of power available, an effort is required to take off in a straight line.

**1.16.2. Flight programming and flights made by the pilot**

Between the start of the firefighting season at Doade on 1 July and the day of the accident, the pilot had flown the PZL M18B aircraft with registration EC-FBJ every day. A list of the flights made by the pilot in the first half of July is shown below.

Date	Aircraft	Total flying time
01/07/2015	M18B EC-FBJ	31 min
03/07/2015	M18B EC-FBJ	20 min
06/07/2015	M18B EC-FBJ	1 hr 40 min
07/07/2015	M18B EC-FBJ	1 hr 09 min
09/07/2015	M18B EC-FBJ	2 hr
10/07/2015	M18B EC-FBJ	2 hr 30 min
11/07/2015	M18B EC-FBJ	2 hr 31 min
12/07/2015	M18B EC-FBJ	1hr 34 min
13/07/2015	M18B EC-FBJ	1 h 35 min
	M18B EC-FAT	40 min
14/07/2015	M18B EC-FBJ	29 min

After the accident, the pilot continued to be involved in the firefighting campaign. In fact, on the day of the accident, and after ensuring that he had not been injured during the accident, he flew aircraft M18B EC-FBJ for 26 minutes.

**1.16.3. Suitability of the Doade forest firefighting base**

The visual aids available at the Doade (Lugo) forest firefighting base that could have helped to avoid the accident have been analyzed.

At the time of the accident, the regulation applicable to restricted-use aerodromes like this forest firefighting base was Order 1957/1966 of 26 October, on conditions and standards for private aerodromes. This order did not require runway centerline markings, though it did require the installation of a windsock.

During the investigation into this accident, Royal Decree 1070/2015 was published on 27 November 2015, Article 18 of which regulates the visual aids required at restricted-use aerodromes. The acceptable means of compliance for Article 18 establish the need to have runway centerline markings and one or more wind direction indicators, though the

acceptable means of compliance does not specify when more than one wind direction indicator is required.

The Doade forest firefighting base does not currently have runway centerline markings, though it does have a windsock.

### **1.17. Organizational and management information**

The operator, SAETA, had a special operator's certificate, ES.COE.A.06, issued by AESA on 3 July 2015, according which the accident aircraft was authorized to be used in surveillance and patrol tasks and to drop water as part of firefighting activities conducted in daytime visual (VFR) conditions.

The company SAETA was also contracted by the Galician regional government to render fire prevention, extinguishing and coordination services using ground-loaded airplanes. As concerns ground-loaded airplanes, the company decided to dispatch reserve PZL M18 airplanes to Galicia so as to offer better services to its client. Specifically, the accident airplane, EC-FAT, was a reserve airplane. When the fire was declared on the day of the accident, EC-FBJ was not ready for immediate departure, so EC-FAT, which was ready, was activated.

### **1.18. Additional information**

Not applicable

### **1.19. Useful or effective investigation techniques**

Not applicable





## 2. ANALYSIS

### 2.1. General

The engine torque on the PZL M18B aircraft is high, creating a significant gyroscopic effect. In his statement, the pilot stated that he felt the airplane deviate slightly to the left and that he attempted to correct this deviation. After detecting the deviation to the left, the pilot was unable to correct it, probably because the rudder deflection was not sufficient to compensate for it. The pilot interpreted this situation as the airplane failing to respond, and proceeded to abort the takeoff.

While trying to abort the takeoff, he had approximately 220 meters of runway before he departed the runway, according to information provided by the operator. This is because he traveled a distance of about 300 meters, and he was unaware of the deviation for the first 80 meters. The 220 meters available were not enough to bring the airplane to a stop on the runway.

At the time of the accident, the runway did not have any centerline markings, which would have helped the pilot align the aircraft and a prompt detection of the shift to the left; however, a safety recommendation will not be issued in this regard since Royal Decree 1070/2015 of 27 November was recently published, Article 18 of which regulates the visual aids that must be available at restricted use aerodromes, including runway centerline markings

In contrast, the weather conditions at the time of the accident are not believed to have played a role in the runway excursion, considering both the pilot's statement and the information provided by AEMET. This information indicated that the wind was from the northwest, from about 300°, at 8 km/h and gusting to 14 km/h. Since the runway is in an 08/26 orientation and the airplane was taking off from runway 26, it encountered a headwind component and a crosswind component to the left, the intensity of both being about 5 km/h and gusting to 9 km/h. Thus, given the low wind speed, it is unlikely that it would have affected the takeoff run.

Moreover, the runway was not wet or contaminated, as per the pilot's statement.



### **3. CONCLUSIONS**

#### **3.1. Findings**

- The pilot had a valid license and medical certificate.
- The aircraft's documentation was valid and it was airworthy.
- The wind in the vicinity of the Doade (Lugo) forest firefighting base was not limiting to the operation at the time of the accident.
- The runway was in perfect condition.

#### **3.3. Causes/Contributing factors**

The investigation has determined that this accident was likely caused by the pilot's loss of control of the aircraft.



#### **4. SAFETY RECOMMENDATIONS**

At the time of the accident, the runway did not have any centerline markings, which would have more easily allowed the pilot to line up correctly and detect the deviation to the left sooner. However, a safety recommendation will not be issued in this regard since Royal Decree 1070/2015 of 27 November was recently published, Article 18 of which regulates the visual aids that must be available at restricted use aerodromes, including runway centerline markings.

