

DATA SUMMARY

LOCATION

Date and time	Friday, 3 December 2010; 09:46 h UTC¹
Site	Sabadell Airport (LELL) (Barcelona)

AIRCRAFT

Registration	EC-KJN
Type and model	TECNAM P2002-JF
Operator	Top Fly

Engines

Type and model	ROTAX 921S2
Serial Number	1

CREW

Pilot in command

Age	30 years old
Licence	Student pilot permit
Total flight hours	26:02 h
Flight hours on the type	26:02 h

INJURIES

	Fatal	Serious	Minor/None
Crew			1
Passengers			
Third persons			

DAMAGE

Aircraft	Significant
Third parties	PAPI unit on runway 21

FLIGHT DATA

Operation	General Aviation – Instructional – Solo
Phase of flight	Takeoff run

REPORT

Date of approval	3 May 2012
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¹ All times in this report are in UTC unless otherwise specified. To obtain local time, add one hour to UTC.

1. FACTUAL INFORMATION

1.1. History of the flight

On 3 December 2010 at 09:30, a student pilot was scheduled to make a local solo flight, leaving from and returning to LELL, onboard a Tecnam P2002-JF aircraft, registration EC-KJN. According to the student's statement, he had prepared all of the necessary documentation and had filed it with the Operations Department at the flight school in order to obtain his instructor's authorization, a prerequisite for making the solo flight. After doing the pre-flight check of the aircraft, the student contacted the control tower, which cleared him to proceed to the runway 31 holding point. Once there, and having completed the relevant engine checks, the student reported being ready for takeoff. The tower instructed him to line up and hold, and subsequently cleared him to take off, reporting wind from 250 to 270 at 15 kt². On starting the takeoff run, the aircraft ran over a bump and started to bounce and veer to the left. The student tried to correct the course with the rudder pedals. When he reached an IAS³ of 40 kt, the student decided, while still on the runway, to cut the throttle and apply the brakes, but the aircraft departed the runway and struck a PAPI⁴ (see Appendix I).

The student was not injured. There was considerable damage to the aircraft's left wing. One of the four units that comprise the PAPI was damaged. An aircraft that was preparing to land two minutes later had to execute a go-around and the runway was closed to traffic for 25 minutes.



Figure 1. Damage to the aircraft

² 270° 10 kt according to ATC communications.

³ IAS: Indicated Airspeed.

⁴ Precision Approach Path Indicator.

1.2. Personnel information

The student pilot, a 30-year old Russian national, was a student in the integrated ATPL course and was in the basic single-engine aircraft learning phase. He had a valid and in force student pilot permit and a medical certificate. According to his flight log, he had some 26 h of flight time, of which all had been on the same aircraft type.

According to his statement, the student had filed the necessary information to obtain his instructor's authorization for the solo flight. This information included the load and balance sheet, the flight plan and the weather information for that day (METAR, TAF, wind map and significant low-level weather chart). The authorization was eventually signed by another instructor, and not by the student pilot's usual instructor.

The student was asked about the wind limitations applicable to the aircraft, which he admitted not knowing.

1.3. Aircraft information

1.3.1. General aircraft information

The TECNAM P2002-JF aircraft, registration EC-KJN and S/N 070, is a single-engine (outfitted with a ROTAX 912 S2 four-cylinder engine, S/N 4923782), low-wing, two-blade propeller airplane with a fixed tricycle gear. The aircraft is classified as a VLA (Very Light Airplane) with a 580 kg MTOW (Maximum Takeoff Weight). This aircraft is used by TOP FLY for training activities. On the date of the incident, the school was undergoing a restructuring process, only to shut down six months later.

The aircraft had valid and in force registration and airworthiness certificates. It also had a valid and in force Noise Level Certificate, Aircraft Station License and Insurance Certificate.

The aircraft had 2,228:43 flight hours, and its last inspection (50-hr) had been performed with 2,221.4 flight hours on 26 November 2010.

1.4. Meteorological information

The meteorological information checked by the student and later provided to the instructor was from 08:57:10 on the day of the incident and read as follows:

METAR LELL 030830Z 25004KT 210V280 CAVOK⁵ 03/M02 Q1011

This was the 08:30 report for 3 December, and reported VMC, good visibility, a temperature of 3 °C and a dew point of -2 °C, and 4-kt wind from 250° variable from 210 to 280.

⁵ (Ceiling And Visibility OK) Visibility in excess of 10 km, no clouds below the reference altitude, no cumulonimbus (CB) or tower cumulonimbus (TCU), and no significant weather phenomena.

TAF LELL 030800Z 0309/0318 30012KT 9999 FEW030

The 08:00 aerodrome forecast, valid from 09:00 to 18:00, called for 12-kt winds from 300°, visibility in excess of 10 km and few clouds at 3000 ft.

Weather information for that day provided after the fact showed that the average wind direction was from the west at speeds of 4 to 9 kt between 08:00 and 09:30, and of 11 kt at 10:00. There were no significant weather phenomena or sufficient cloud cover to affect operations.

The specific wind⁶ information applicable to the aerodrome on that day was as follows:

- 09:40:00: 270° 10 kt.
- 09:50:00: 270° 9 kt.

For takeoffs from runway 31 (310°), the wind reported by the tower just before the takeoff clearance was given (270° 10 kt) would have been equivalent to a 6.42 kt crosswind.

1.5. Aerodrome information

The Sabadell Airport is an aerodrome intended for General Aviation use under visual flying conditions (VFR). It is located 2 km south of the city of Sabadell. It has one 1050-m long, 30-m wide runway in a 31/13 orientation. The aerodrome reference point is at an elevation of 485 ft.

1.6. INFORMATION REGARDING WIND LIMITATIONS

1.6.1. *Information regarding the aircraft's wind limitations*

According to the Aircraft Flight Manual in the school's possession, dated 29 March 2004, the maximum demonstrated crosswind velocity was **6 kt**. In the graph adjoining this section, however (see Appendix II), the limit separating the Safe Operation zone from the Unsafe Operation zone was 15 kt.

This manual was compared with the updated version (notified via Service Bulletin no. P2002/03, approved by the EASA on 3 August 2005) sent by the manufacturer, which revealed one change in this regard. The *maximum demonstrated crosswind velocity* had been changed to **22 kt**, though the limit between the Safe and Unsafe Operation zones

⁶ Average wind measured in the 10 minutes before the hour by the runway 31 anemometer.

was still 15 kt. The manufacturer was asked about this significant difference between the crosswind speeds, to which it replied that initially, it had been unable to conduct tests at speeds in excess of 6 kt, and that until winds in excess of 22 kt were present, it could not verify that the aircraft could withstand those conditions. With regard to the 15-kt limit, the manufacturer committed to making the relevant updates, though this Commission is unaware of any such changes having been made yet.

1.6.2. *Information regarding the TOP FLY wind limits*

According to the rules in place at the flight school, the weather condition limits for solo student flights included, among others:

- Maximum headwind: 15 kt.
- Maximum crosswind: 5 kt.
- Maximum gusts: at instructor's discretion.

Variable wind conditions: allowed up to 30° to either side of the runway in use. Tailwinds, rain, turbulence, icing – not allowed.

1.7. **Crosswind takeoff**

The piloting technique for taking off with a crosswind recommends adhering to the following guidelines:

- The aircraft should be steered primarily with the rudder pedals.
- Start the takeoff run with the control stick turned into the wind and align with the runway centerline with the rudder.
- Rotate while keeping the ailerons deflected such that the wind-side wing is below the horizontal and the opposite-side wing is above.
- Once airborne, correct the aircraft's heading to line up with the wind. That is, the aircraft's flight path should line up with the runway but the nose should be turned into the wind, meaning that the rudder pedals will be used more than the ailerons.

2. **ANALYSIS**

The student had checked the documentation and the aircraft prior to the flight. He had also filed the documentation with the operations department for approval and for his instructor's authorization for the solo flight. This authorization had been signed by an instructor who was not the student's usual instructor. The student contacted the tower to report his intentions, and the tower cleared him to take off, providing additional real-time wind information of 270/10 (the student recalled a wind speed in excess of 15 kt).

This meant the crosswind component was 6.42 kt, which, in keeping with the Flight Manual and the aircraft's limitations, meant that the student should have considered the possibility of not taking off. When the student was asked about the aircraft's limits in terms of wind speed, he admitted not knowing them. In addition, the instructor who authorized the solo flight should have been supervising every step taken by the student during the performance of this flight, and should herself have realized that the crosswind was excessive and warned the student not to take off under conditions that exceeded those specified in the Flight Manual (6 kt) and in the school's own rules for authorizing solo student flights (5 kt). Finally, it was noted that a change had been made to the Flight Manual by the manufacturer in 2005 that affected this maximum demonstrated crosswind value and reflected that the aircraft could easily withstand this limitation. This fact also demonstrates that the school did not maintain its flight manuals updated. These deficiencies, both as regards the supervision of a solo student by training center personnel, as well as the center's obligation to keep the flight manual updated, would normally require the issuing of several safety recommendations. Such recommendations have not been made in this case due to the closing of this training center.

Another aspect to consider is the student's lack of experience and knowledge regarding the technique to use under such crosswind conditions and how to identify that such conditions exist. According to his statement, the student only attempted to correct the course deviation using the rudder pedals without being able to identify the reason for the deviation. As a result, his input to the rudder pedals may not have been as forceful as required. He also did not provide any inputs to the ailerons. This lack of knowledge is evidence of a weakness on the part of the school when instructing its student pilots. Also, the student's usual instructor did not sign the authorization for his solo flight. This could mean that the authorizing instructor did not pay sufficient attention to the conditions under which the flight was to be carried out and did not supervise the student's actions, which would be another point for the school to reinforce in terms of its instructional technique.

3. CONCLUSIONS AND CAUSES

3.1. Findings

Based on the information analyzed, the following conclusions can be drawn:

- The aircraft was airworthy, had its documentation in order and had passed its last inspection.
- The student's documentation was valid and in order.
- The student had checked the aircraft prior to the flight and had prepared the documentation required to perform the flight.
- This documentation was checked by an instructor who authorized the student to make the flight.

- The school has additional, specific criteria regarding wind speed and variation before an instructor can authorize a student solo flight. These criteria limit the crosswind to 5 kt.
- The limit in the Flight Manual in terms of the maximum demonstrated crosswind velocity was 6 kt.
- The limit separating the Safe and Unsafe Operation zones in the adjoining graph, however, was 15 kt.
- The student had checked the weather information prior to the flight and had been given the latest information by the tower before being cleared for takeoff.
- The crosswind component based on the METAR was 3.46 kt (250° at 4 kt), but that reported by the control tower would have been 6.42 kt (270° at 10 kt).
- The student did not know the aircraft's crosswind limits.
- The instructor did not warn the student of these limits prior to takeoff.
- In 2005, the manufacturer updated its demonstrated crosswind velocity limitation from 6 to 22 kt.
- The updated Flight Manual, however, still specified 15 kt as the limit separating the Safe and Unsafe Operation zones, though the manufacturer committed to making the necessary updates. The school did not have the updated Flight Manual.
- The aircraft was therefore able to withstand the wind conditions that existed at the time the takeoff clearance was given.
- The student did not correctly apply the procedure for taking off in a crosswind.

3.2. Causes

The incident occurred due to the improper application of the technique for taking off in a crosswind. The student pilot's little experience and the lack of effective supervision by the training center were contributing factors.

APPENDIX I
Diagram of aircraft trayectory

AIP
ESPAÑA

AD 2-LELL ADC
WEF 22-OCT-09

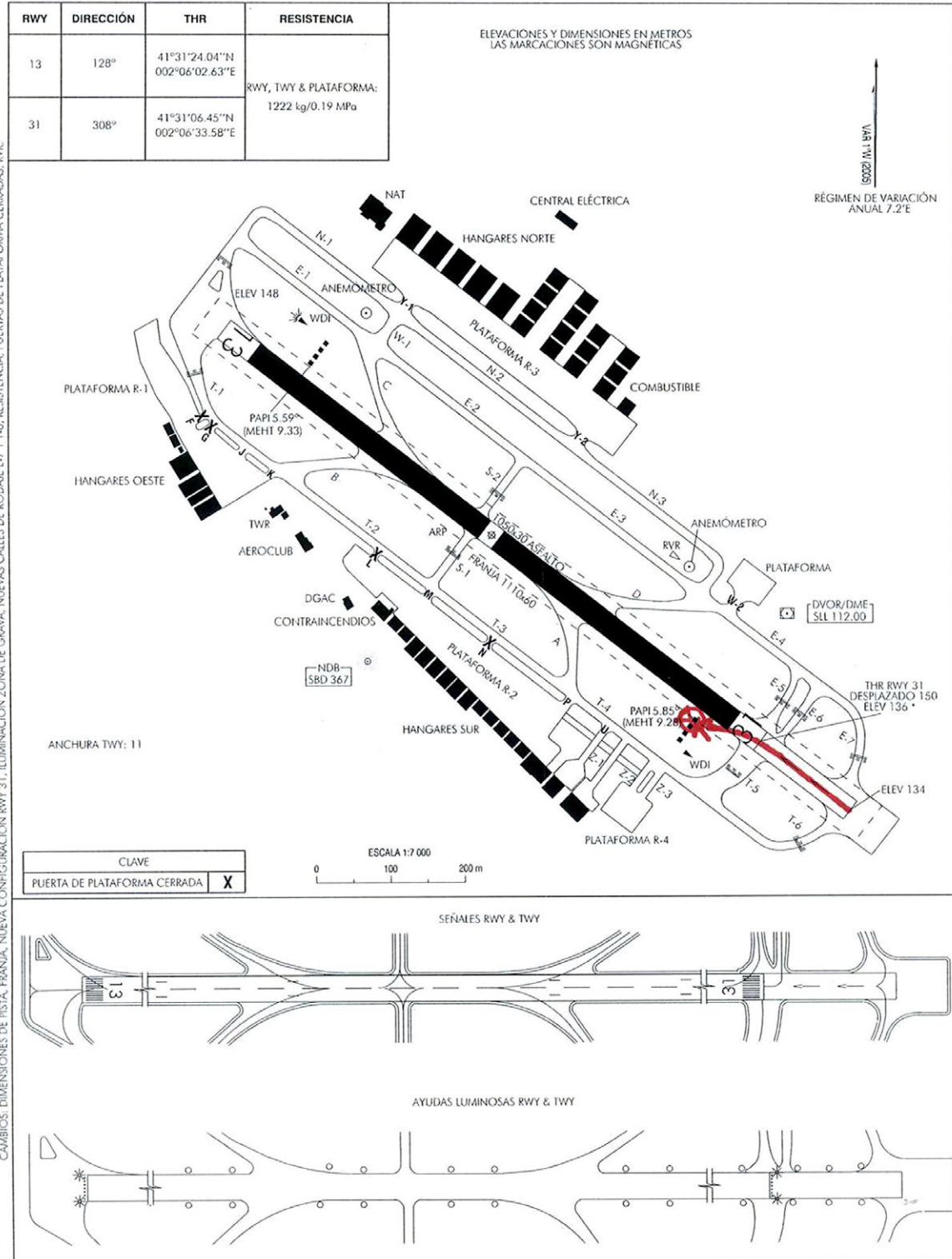
PLANO DE AERÓDROMO-OACI

41°31'15"N
002°06'18"E

ELEV 148 m

TWR 120.80
GMC 121.90

SABADELL



AIS-ESPAÑA

AIRAC AMDT 11/09

APPENDIX II
Wind limits in the two versions
of the flight manual



FLIGHT MANUAL

P2002-JF
SECTION 5
Performances

CROSSWIND

Maximum demonstrated crosswind velocity is 6 kts

⇒ Example:

Given
Wind direction = 30°
Wind velocity = 20 Kts

Find
Headwind = 17.5 Kts
Crosswind = 10 Kts

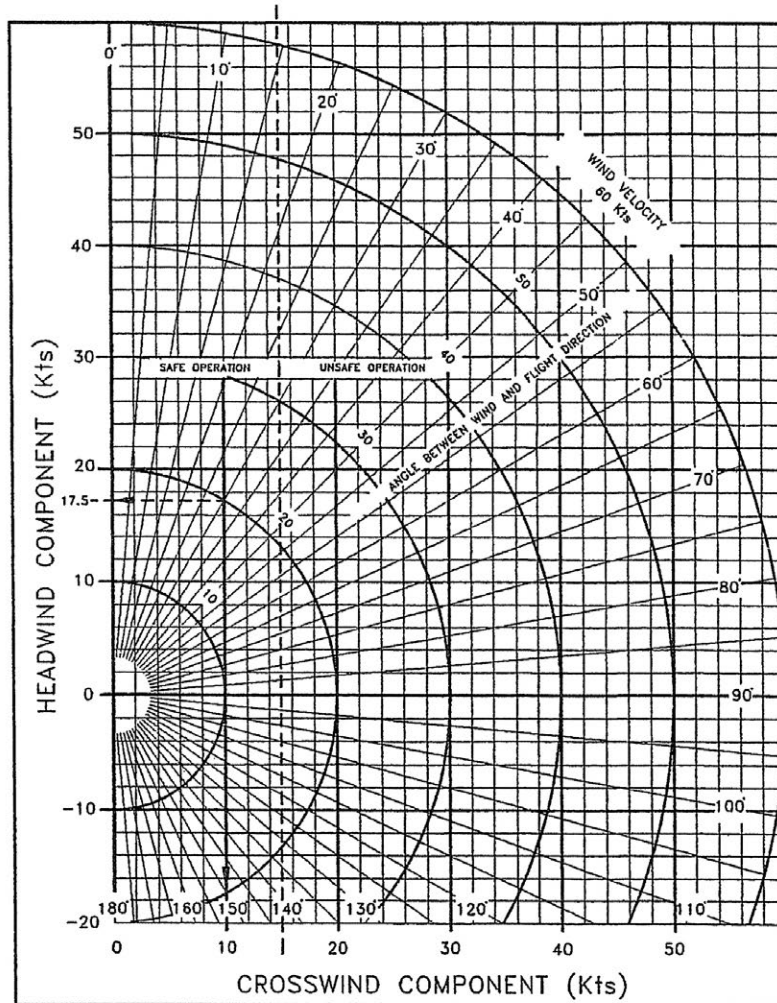


Fig.5-3.CROSSWIND CHART



FLIGHT MANUAL

P2002-JF
SECTION 5
Performances

CROSSWIND

Maximum demonstrated crosswind velocity is 22 kts

⇒ Example:

Given
Wind direction = 30°
Wind velocity = 20 Kts

Find
Headwind = 17.5 Kts
Crosswind = 10 Kts

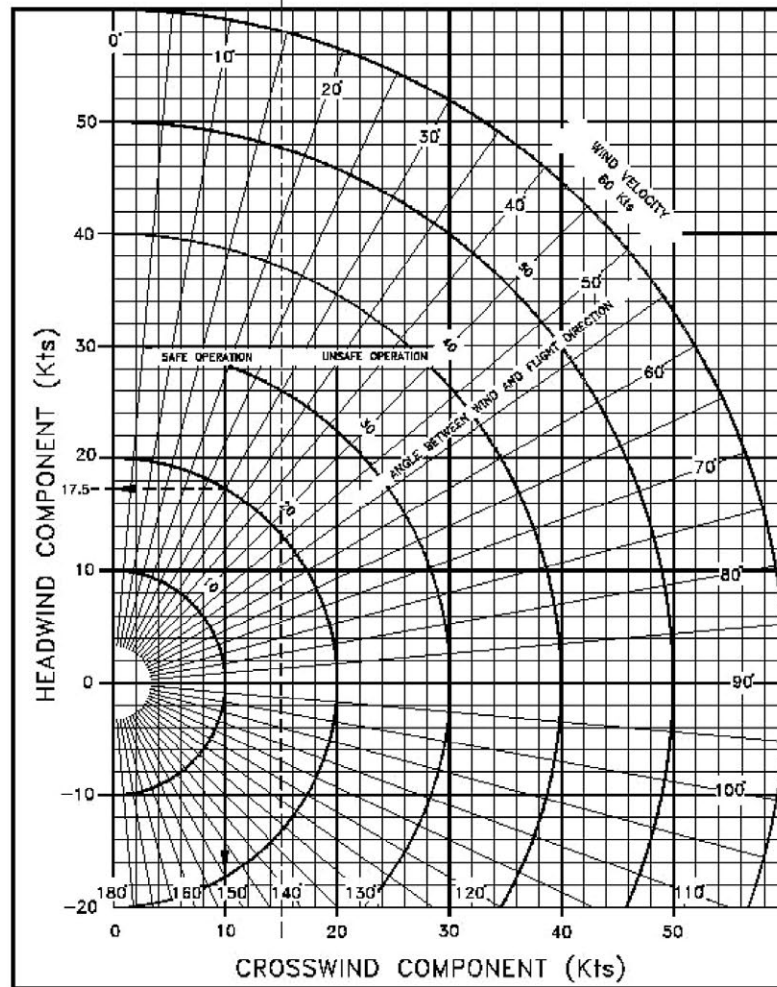


Fig.5-3.CROSSWIND CHART