



This investigation has been conducted in accordance with
*Annex 13 to the ICAO Convention on International Civil
Aviation, EU Regulation No 996/2010 and
The Civil Aviation (Investigation of Air Accidents and Incidents) Regulation; Legal
Notice 16 of 2013.*

Under these Regulations, the sole objective of the investigation of an accident or incident is the prevention of accidents and incidents in the future. It is not the purpose of this investigation to assign fault or blame and the reporting process should not be used to determine liability.

A safety investigation report for the runway excursion of the Cessna 172, Reg No. 9H-AEX

1. General Information.

Location: Malta International Airport	Accident Number: BAAI/SIR-001-2020
Date & Time: 3 rd November 2019, approximately 8:45 am (Local)	Registration: 9H-AEX
Aircraft: Cessna 172	Aircraft Damage: Aircraft suffered a punctured nose wheel and damaged nosewheel hub.
Defining Event: Runway excursion following landing on RWY 31	Injuries: No injuries Reported

2. Synopsis

A Cessna 172 took-off from RWY 23 but was instructed to land on RWY 31 in a crosswind condition due to RWY 23 not available for landing at the time (Notam A1316-19). The aircraft landed right of the RWY centreline and following 60 m roll, the aircraft exited the RWY surface suffering an excursion onto the grass. In the process, the aircraft nosewheel hit a runway edge light (which is mounted on a concrete base) and suffered a punctured tyre and serious damage to the nosewheel hub.

3. Factual Information

Aircraft and Owner/Operator Information

Aircraft Make: Cessna

Model/Series: 172

Aircraft Category: General aviation, single engine aircraft

Aircraft Dimensions: Shown in Fig. 1

Landing Gear Type: Tricycle

Seats: 4

Certified Max Take-off Wt.: 1,156 kg

Registration: 9H-AEX

Registered Owner: Malta School of Flying

Operator: Malta School of Flying

Time of accident: The accident took place at ca. 8:45 am LT. The investigators have been called on site at ca. 8:50 am LT. The investigators were on site at approx. 9:30 am.

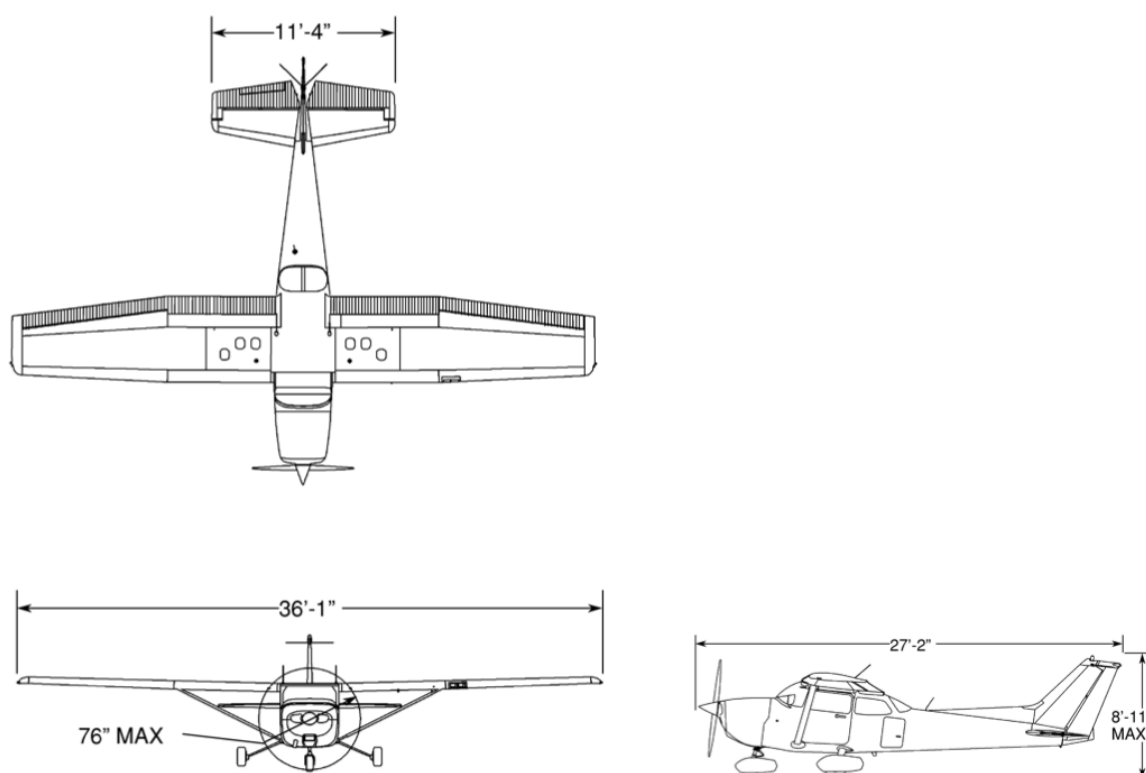


Fig. 1: Overview of the aircraft dimensions

Meteorological Information

Conditions at Accident Site: Visual conditions clear

Condition of Light: Day

Lowest Cloud Condition: N/A

Lowest Ceiling: N/A

Wind Speed/Gusts: Avg. wind speed 10.6 Kts, Gusting between 7.4 Kts - 15.9 Kts

Forecast/Actual: Measured

Wind Direction: Average direction 217°, with variations between 206° to 228°

Forecast/Actual: Measured

Altimeter Setting: N/A

Temperature/Dew Point: N/A

Precipitation and Obscuration: None

Airport Information

Airport: Malta International Airport

Geographical coordinates: N 35°51'/E 014°28'

Runway Designation: RWY 31

Runway Heading: 312°

Runway Surface Type: Tarmac

Airport Elevation: 230 ft

On-Site Investigation.

The aircraft came to rest on the grass at an angle to runway RWY 31. The touchdown position could be traced back from the surface marks left by the aircraft on the runway. Fig. 2 shows an overview of the airport layout, including the direction of the aircraft approach. Fig. 3 is a sketch of the aircraft final resting position. The touch-down marks and the final resting position are shown in Fig. 4 and Fig. 5. The punctured nosewheel tyre, damaged nosewheel hub and the runway edge light (*which is mounted on a concrete base*) are shown in Fig. 6 and Fig. 7, respectively.

Aircraft approach direction



Fig. 2: Overview of the airport runways.

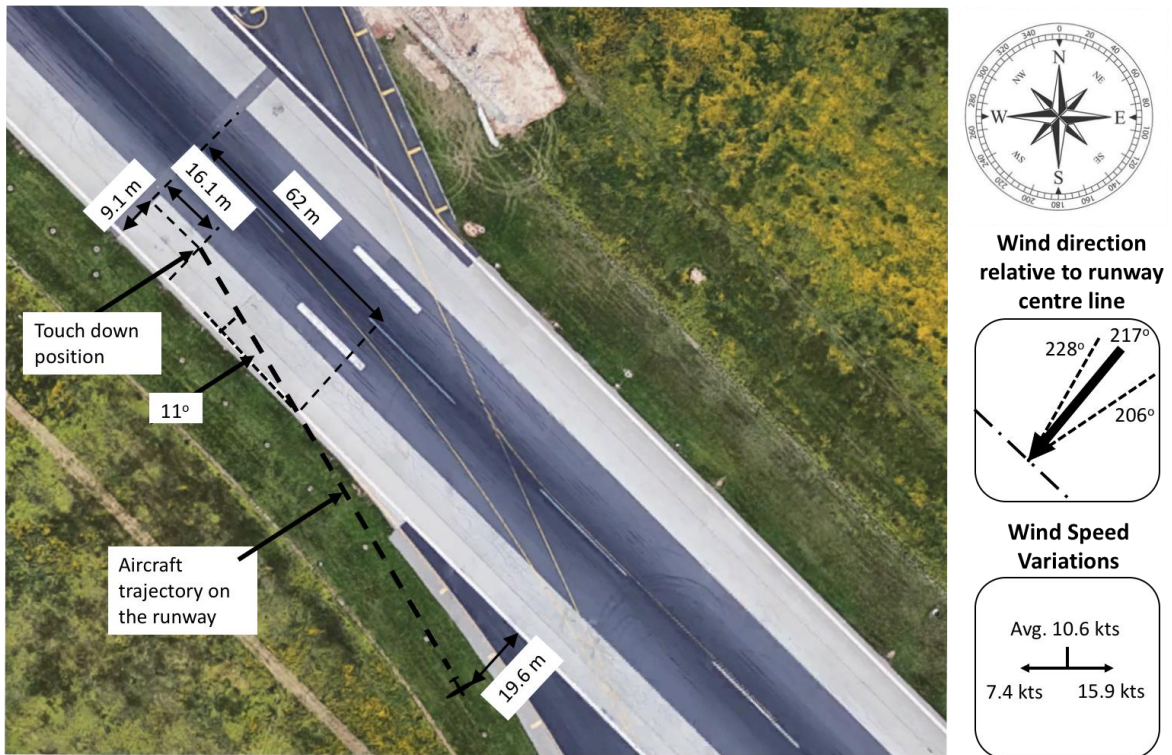


Fig. 3. Sketch of the final resting position of the aircraft.

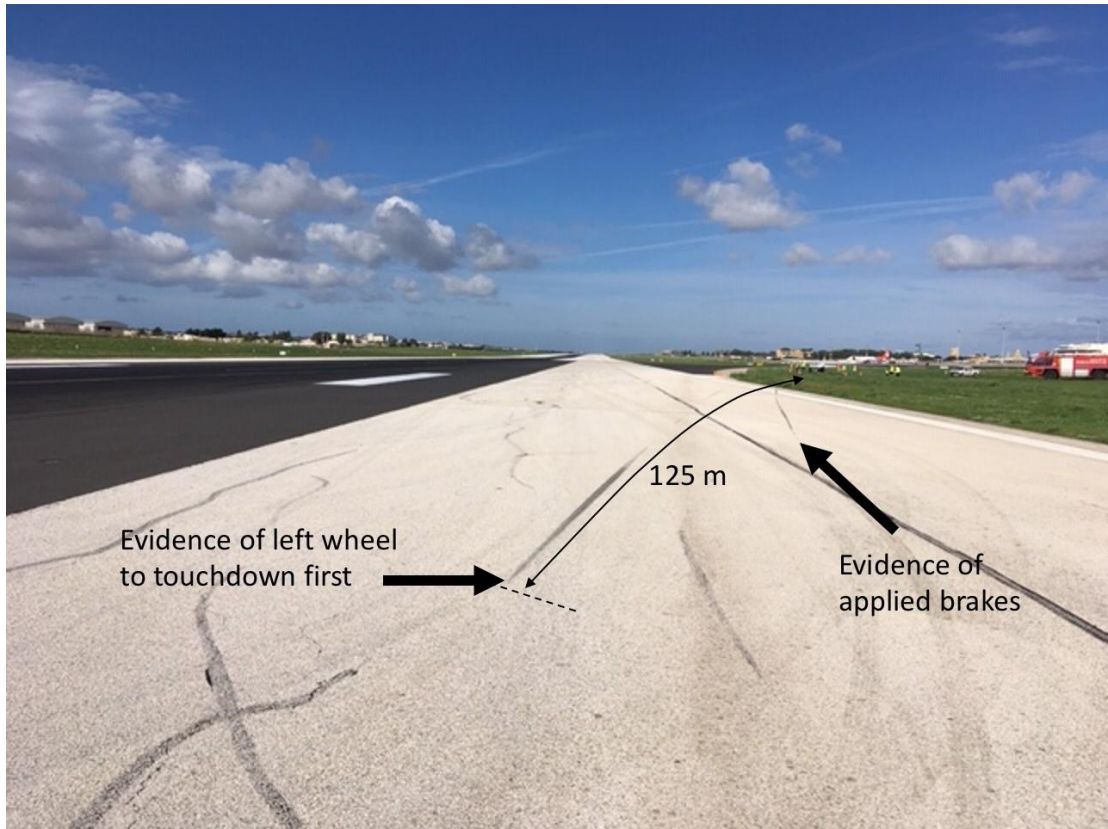


Fig. 4. Touch down marks and locked right wheel.



Fig. 5. The aircraft in its final resting position.



Fig. 6. The nose wheel punctured tyre and damaged wheel-hub at the aircraft's final resting position.



The RWY edge light's metal frame was found to be the cause of the punctured nose wheel

Evidence of wheel marks on RWY edge light concrete base

Fig. 7. Cause of punctured nose wheel tyre following runway excursion.

4. Findings

The aircraft, a Cessna 172, Reg. No. 9H-AEX has veered off the runway following a landing on RWY 31 in crosswind conditions.

4.1 Considerations before take-off

A weather report (METAR) was issued on the day of the flight. At 7:15UTC this read:

2019-11-03 07:15UTC METAR LMML 030715Z 23012KT 180V240 9999 SCT025 22/17 Q1013 NOSIG=

The wind is reported to be 230°/12kts varying between 180° to 240°. The wind speed and direction retrieved through the MET Office station located close to RWY 31 are shown in Fig. 8 and Fig. 9.

According to the official Cessna 172 technical/operating manual, the aircraft is within limits (*wind conditions limitations*) to operate, however, the responsibility rests on the pilot to assess the weather conditions and then decide if his/her skills are suitable to perform a safe flight in those conditions. Following a pilot interview, this investigation finds that the pilot had committed to this flight to his only passenger, days before the day of the accident.

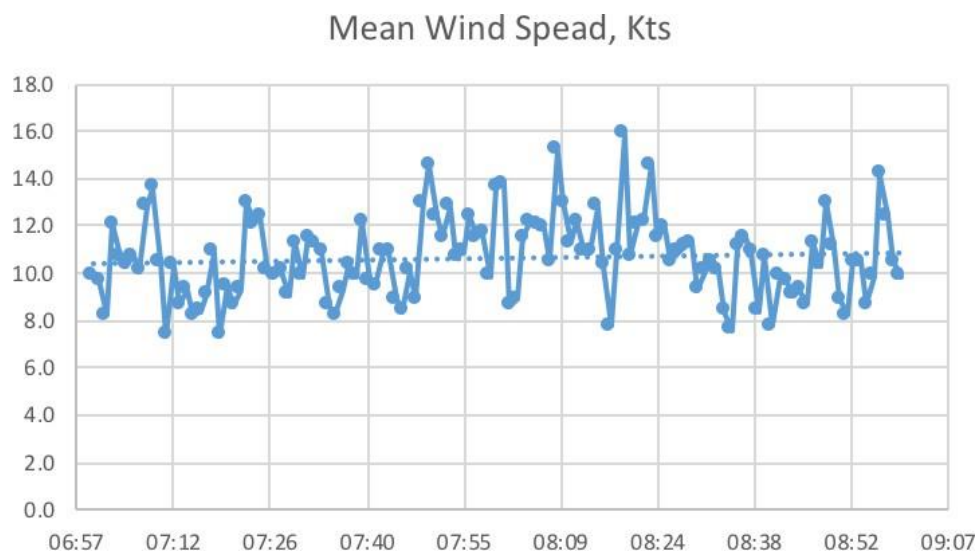


Fig. 8. Wind speed measurements

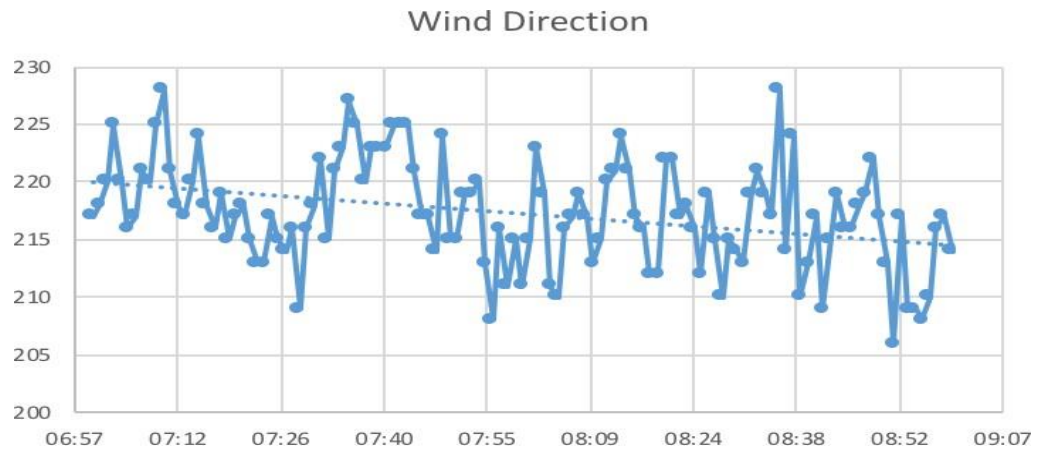


Fig. 9. Wind direction measurements

4.2 Considerations prior to landing

During final approach, ATC cleared the aircraft to land on RWY31 and as procedure, provided the wind direction and speed information.

ATC Transcript 07:42:20 LT ADC: 9EX, Wind 210 degrees 10 knots Runway 31 cleared to land, after landing to the end

The pilot did request RWY 23, which had much more favourable wind conditions, but was instructed to land on RWY 31 as per NOTAM A1316-19.

ATC Transcript (Time UTC)

07:36:56

ADC: 9BW, report right Base Runway 31.

A/c: Wilco, 9BW.

A/c: Runway 23 not available?

ADC: Negative, NOTAM due to Fireworks, 23 only available for Takeoffs.

A/c: OK copied continuing to right Downwind Runway 31.

4.3 Landing Technique

The last wind-data provided to the pilot in the landing clearance (7:42.2am LT) was 220/9; giving a Crosswind component of 9kts and an insignificant tailwind component of 0.3kts. The aircraft operation/technical manual states that the aircraft has a demonstrated¹ crosswind velocity of 15 kts. Therefore, while the aircraft was certified to fly in such a crosswind, it requires appropriate pilot skills to land in these conditions for this class of aircraft.

4.3.1 Crosswind landing

A crosswind landing is a landing manoeuvre in which a significant component of the prevailing wind is perpendicular to the RWY (various according to the angle between the wind direction and the direction of the RWY). This subjects the aircraft to drift laterally as it approaches the RWY, posing a significant risk as the aircraft needs to be aligned with the RWY centreline at touchdown.

Basically, there are two crosswind landing techniques; Crabbed and Sideslip landings. During the pilot interview, it was found that the pilot attempted a crabbed technique which requires the aircraft to approach the runway with its' nose into the wind. Just before touchdown, the aileron is turned into the wind and RWY centreline is maintained by an appropriate input on the opposite rudder, thus preventing the aircraft from drifting away from the centreline. The touchdown marks left by the aircraft on the RWY show that the technique was not applied correctly as the aircraft did not align with the runway centreline and drifted sideways. This suggests that the wind conditions at the time of the accident may have been beyond the pilot ability to execute a safe landing.

4.4 Considerations after landing

The passengers and crew of an aircraft that has been involved in an accident are expected to evacuate the aircraft to a safe distance from the aircraft, and do not return or board the aircraft until it has been declared safe to do so. This investigation notes that following the landing, the passenger and PIC evacuated the aircraft, but the PIC returned to the aircraft to inform ATC about his status and crash position.

The Bureau of Air Accidents Investigations (Malta) has determined that the cause of this accident was an improperly applied crosswind landing technique due to inexperience.

¹The demonstrated crosswind velocity is the velocity of the crosswind for which adequate control of the airplane during take-off and landing was actually demonstrated during certification tests

5. Recommendations

The ATC tower is approximately 1.9km away from the accident site. ATC personnel have limited visibility of the area where the accident took place. In this case a second aircraft that was on approach reported that he had visual with the aircraft 9H-AEX on the grass. It is also noted that ATC was not aware of the position of the crashed aircraft with respect to a Wizz Air aircraft on TXW Charlie. The situation was resolved with the assistance of the Fire Crew Commander, through radio communication. Therefore, this report recommends the following:

Recommendation 1:

It is recommended that additional support in the form of high-resolution vision cameras and infrared cameras are set up in this area to assist ATC personnel.

It is customary for general aviation aircraft to request landing midway of RWY 31. This was also the case here, as shown by the ATC transcript:

ATC Transcript 07:39:00

A/C: Luqa Tower 9Ex entering right Base Runway 31, request mid-field landing

It is noted that while the pilot requested midfield landing the aircraft touched down on the initial portion of the runway and suffered an excursion with the final resting position near taxiway 'C' (Charlie). It is worth noting that in cases where RWY 23/05 is not fully operational, the operation of RWY 31 becomes critical. This report therefore takes a broader context of safety and recommends the following:

Recommendation 2:

Midfield landing should be properly defined, and its position published on the AIP. It is suggested that midfield for RWY 13/31 will be defined as midpoint between TWY 'C' and TWY 'F'.

In 2018 the company offering aircraft for hire has issued a ***Safety policy on wind limitation*** for private hire flights. These include 15 knots maximum cross wind component including gusts in dry and paved runway and 10 knots maximum cross wind component including gusts in damp, dry or unpaved runway. The policy highlights that it is the pilot's responsibility to ensure that these limits are not exceeded during operations, at the departure/arrival/alternate aerodrome. It is also noted that the safety policy urges pilots to individually set lower limits and that flight cancellations for weather related reasons are understandable and will not incur any cancellation charges.

Prior to flying, aircraft hirers sign a legally binding document highlighting ***Local and Safety Policy***.

Additional Comments.

This report was circulated with all stake holders for feedback. In his feedback the pilot has changed his version of events on two points, as follows:

Section 4.2, the pilot commented that:

"A beam runway 23 I did request to land on runway 23 but this was refused due to the NOTAM!"

This investigation highlights that the PIC was aware of the wind conditions and that landings on RWY23 were not permitted at the time of his planned arrival. Therefore, careful considerations and good judgement should be exercised prior to committing for take-off.

Section 4.4, the pilot commented that:

"Also if I remember correctly I did not exit and return to the aircraft but I switched off and back on the radio to tell them where I was and what happened since they did not see me but another aircraft did see me on his final."

The statement is in contrast to what was said during the interview. The PIC said that the two persons on board evacuated the aircraft and then he returned to the aircraft to inform ATC of the situation. This investigation highlights that upon a crash landing, the aircraft should be secured by switching off all systems. Nothing may be switched on again before it is cleared to do so by engineering/competent authorities. The reason for this is to mitigate as much as possible the risk of fire.

ABBREVIATIONS

ATC	-	Air Traffic Control
ATIS	-	Automatic Terminal Information Service
ICAO	-	International Civil Aviation Organization
LMML	-	Malta International Airport ICAO Code
MATS	-	Malta Air Traffic Services
MTOW	-	Maximum Take-off Weight
NOSIG	-	No Significant Weather
PPL(A)	-	Private Pilot Licence (Airplane)
QNH	-	Atmospheric Pressure adjusted to Mean Sea Level
SEP(Land)	-	Single Engine Piston (Land)
VFR	-	Visual Flight Rules
WGS84	-	World Geodetic System 1984

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