

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY



Air Accident Investigation Sector

Accident

- Summary Report -

AAIS Case N° AIFN/0009/2020

Gyrocopter Landing Strip Excursion after Landing

Operator:	Nad Al Sheba Private Club
Make and Model:	Gyrocopter – ROTOX 914
Nationality and Registration:	United Arab Emirates, A6-GY7
Place of Occurrence:	Nad Al Sheba, Dubai
State of Occurrence:	The United Arab Emirates
Date of Occurrence:	24 July 2020



This Investigation was conducted by the Air Accident Investigation Sector of the United Arab Emirates pursuant to Civil Aviation Law No. 20 of 1991, in compliance with Air Accident and Incident Investigation Regulation, and in conformance with the provisions of Annex 13 to the Convention on International Civil Aviation.

This Investigation was conducted independently and without prejudice. The sole objective of the investigation is to prevent future aircraft accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

The Air Accident Investigation Sector issued this Summary Report in accordance with national and international standards and best practices. Consultation with applicable stakeholders, and consideration of their comments, took place prior to the publication of this Report.

The Summary Report is publicly available at:

<http://www.gcaa.gov.ae/en/epublication/pages/investigationReport.aspx>

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Investigation Process

The occurrence involved a gyrocopter aircraft, registration A6-GY7, and was notified to the Air Accident Investigation Sector (AAIS) Duty Investigator (DI) by phone call to the Hotline Number (+971 50 641 4667) on 24 July 2020.

After the initial on-site investigation phase, the occurrence was classified as 'Accident'.

The scope of this Investigation is limited to the events leading up to the occurrence; no in-depth analysis of non-contributing factors was undertaken.

Notes:

1. Whenever the following words are mentioned in this Report with first capital letter, they shall mean the following:
 - (Accident). This investigated accident
 - (Aircraft). The gyrocopter involved in this accident
 - (Club). Nad Al Sheba Private Club
 - (Investigation). The investigation into the circumstances of this accident
 - (Pilot). The pilot of the accident aircraft
 - (Report). This Summary Report.
2. Photos and figures used in this Report are taken from different sources and are adjusted from the original for the sole purpose to improve the clarity of the Report. Modifications to images used in this Report are limited to cropping, magnification, file compression, or enhancement of colour, brightness, contrast, or addition of text boxes, arrows, or lines.
3. The structure of this Summary Report is adapted from the Annex 13 Final Report format.

Factual Information

History of the Accident

On 24 July 2020, a Gyrocopter Pilot arrived at Nad Al Sheba Private Club to conduct a solo flight

around the Club's flying area. As per the Pilot's statement, he was well-rested before the flight.

The Pilot stated that he checked the meteorological terminal air report (METAR) and terminal aerodrome forecast (TAF) via www.avmet.ae before arriving for the flight. The Pilot found the wind component reported in the METAR is within the performance limitations of the Aircraft.

The Aircraft took off at 07:00 LT of the United Arab Emirates. After completing two hours of flight, the Pilot decided to return to the Club and end the flight. Accordingly, the Pilot entered the circuit of the Club's landing strip 35 to commence approach in preparation for landing.

The Pilot stated that he reported two nautical miles left downwind for landing strip 35, when he was on the downwind leg. He reported that he was on final approach to alert the surrounding traffic of the Aircraft position. The Club landing strip did not include an air traffic control (ATC) service, and therefore, pilots need to maintain (Listening Watch) on the radio and continuously report their position for separation.

The Pilot stated that the Aircraft experienced a tailwind during approach, which resulted in increasing the ground speed. According to the Pilot's statement, the windsock, which was located near the landing strip, indicated a five-knot tailwind on approach. However, the Investigation checked the wind component during the time of the flight by reviewing the TAF and it showed a wind component of 10 to 13 knots.

The Pilot stated that on touchdown, he felt that the Aircraft is approaching the end of the landing strip fast. He, therefore, tried to keep the Aircraft nose up to reduce the speed while applying the wheel brakes gradually. However, all attempts to reduce the speed were unsuccessful.



Figure 1. Aerial view of Club and the field

Reviewing the closed-circuit television (CCTV) recording showed a nose-up attitude while the speed was still high. The recording also showed the Aircraft impacting the fence at the end of the landing strip. The Aircraft flipped sideways to the right after the impact, sustaining substantial damage.

Damage to Aircraft and Property

The Aircraft sustained substantial damage. The rotor blades of the Aircraft fractured. The Aircraft nose severely damaged after impacting the fence at high speed. The engine cowling detached. The Aircraft fuselage broke up (Figures 2, 3 and 4).

Property damage was limited to the fence and scars on the grass area.



Figure 2. Damage to rotary blades



Figure 3. Aircraft nose



Figure 4. Damage to the tail



Figure 5. Damage to the fence

Personnel Information

The Pilot held a valid light sport activities license issued by the GCAA with privilege of flying all gyrocopter aircraft.

According to the Club's grading policy, scores are determined according to the following criteria:

1. The exercise is introduced/practiced
2. Good, but not consistently competent
3. Consistently Competent (meets license standards)
4. Exceeds (advanced level, knowledge and skills).

The Pilot had been trained at the same Club. His training record revealed that he had undergone all eight stages of training as annotated in Club's training program. At stage two of the training, the Pilot achieved score '2' for most of the training topics. These topics were: coordinating stick and pedal with power changes, and the effect of wind when flying at straight line. The Pilot



achieved the standard required (score 3) after three flights in those items.

In addition, the Pilot achieved score '1' in stage 3 in two sorties: circuit pattern; and go-around. This score is given for all sorties that are practiced for the first time for the trainee Pilot. The Pilot achieved the standard score '3' in these two sorties. Moreover, the Pilot achieved score '2' in landings within different wind conditions before achieving the standard score '3' in the next flight.

The Pilot was cleared to fly solo by his instructor on 27 April 2020 after completing the skill test to a standard level as per his Instructor's comment.

Based on the Pilot's logbook, he had a total of 96 flying hours, and 472 landings.



Figure 6. Damage to the grass area

Aircraft Information

Gyrocopter is a type of rotorcraft that is lifted by a free-spinning rotor.

The free-spinning rotor does not require an anti-torque device, such as a tail rotor, because there is no torque load associated with the free-spinning rotor. The most common gyrocopter configuration are comprised of: airframe; landing gear; single rotor which, in general, has either two or three blades; propulsion engine and propeller in either pusher or tractor (puller) configuration; aeroplane-style tail assembly with a vertical fin and rudder; and horizontal stabilizer and elevator.

The principle of the rudder and elevator flight controls are similar to the aeroplane.¹

The gyrocopter involved in the Accident was equipped with ROTOX 914 engine, which is a 4-cylinder, four-stroke, spark-ignition engine with opposed cylinders and turbocharger. Also, it was equipped with three blades propeller of a diameter of 172 cm. The gyrocopter extends on a length of 5.08 meters, a width of 1.88 meters and a height of 2.71 meters

As per the *pilot operating handbook*, the maximum tailwind component for takeoff and landing is five knots.

In addition, the *pilot operating handbook* outlines more than one way for engine shutdown, such as:

1. Switch magnetos to 'off'; or
2. If not successful, follow the following alternative methods:
 - Hold throttle lever at IDLE position firmly while overstretching the cable ends of the carburetor control cables with the other hand; or
 - Engage full choke, wait a few seconds and open the throttle suddenly. This normally chokes the engine and causes it to stop.

Landing in tailwind conditions will increase the ground speed at touchdown which will result in a long landing. The stopping distance will be significantly increased due to the higher groundspeed and, in combination with a long landing, could easily result in runway excursion.²

¹ Source: www.skybrary.aero

² Source: www.skybrary.aero



Airfield Information

The Club used a landing strip for takeoffs and landings (designated clearly 17/35). In addition, a wind sock is located to the right of the landing strip landing on 35, and to the left landing on 17. (Figure 7)



Figure 7. Landing strip 35 with designation clear on the surface.

Weather

The weather information was checked through the website of aviation Meteorology Centre www.avmet.ae³, which is operated by the National Meteorological Center. The website provides around-the-clock weather information in form of METAR and TAF.

For the flight planning, the Pilot used the following METAR data for Dubai International Airport (OMDB) which was twenty Kilometres away from the Club, and for Al Maktoum International Airport (OMDW) which was 53 Kilometers away.

*METAR OMDB 240000Z 07004kt
360V130 CAVOK 33/24 Q1000 NOSIG=*

According the above OMDB METAR issued on 24 July, at 0000 UTC (0400 UAE time), wind was blowing from direction 070 degrees at 4 knots with variable wind direction observed between 360 and 130 degrees. Ceiling and Visibility OK (no clouds below 5,000 feet or minimum sector altitude whichever is higher, and there was no current or forecast significant weather such as precipitation). Temperature was 33 degrees

Celsius and the dew point was 24 degrees Celsius. The barometric pressure (measured from mean sea level) was 1,000 hPa, and no significant change.

*METAR OMDW 240000Z 16003kt
100V190 CAVOK 32/26 Q1001
NOSIG=*

For OMDW, on 24 July at 0000 UTC (0400 UAE time), wind was blowing from direction 160 degrees at 3 knots with variable wind direction observed between 100 and 190 degrees. Ceiling and Visibility OK (no clouds below 5000 feet or minimum sector altitude whichever is higher and there is no current or forecast significant weather such as precipitation), with visibility more than 10 kilometres. The temperature was 32 degrees Celsius and the dew point was 26 degrees Celsius. The barometric pressure was 1,001 hPa, and no significant change.

The Investigation was also provided the TAF reports of (OMDB) and (OMDW)⁴ as follows:

TAF OMDB 2403/2405 18010KT

According to OMDB TAF covering the period from 24 July 0300 UTC to 25 July 0500 UTC (24 July 0700 Local time to 25 July 0900 local time), the wind is blowing from 180 degrees at 10 knots.

*TAF OMDW 2400/2506 08008KT 8000
NSC BECMG 2401/2403 17013KT
PROB30 2402/2406 4000 DU*

According to Al Maktoum International Airport (OMDW) TAF covering the period from 24 July 0000 UTC to 25 July 0600 UTC (24 July 0400 Local time to 25 July 1000 UAE time), the wind is blowing from 080 degrees at 08 knots, expected to become blowing from 170 degrees at 13 knots, a probability of 30% on 24 July between 0200 UTC and 0600 UTC (0600 local times to 1000 local times). The visibility will reduce to 4,000 meters with dust.

TAF shows a tailwind component beyond the Aircraft landing limitation on landing strip 35, which was later confirmed by the Pilot.

³ A website dedicated to provide aviation meteorology data. It is managed by the National Center of Meteorology of the United Arab Emirates.

⁴ The Investigation reviewed the part of the TAF that covers the flight time only.



The Pilot stated to the Investigation that he will elect the go-around choice if he has the same situation again, and he will repeat the same action of the same conditions still prevail on landing. The Pilot mentioned to the Investigation that he had not thought about landing on the other direction of the landing strip.

The Investigation also verified that the Club had no weather installation to provide accurate and timely weather information for the pilots.

Organizational and Management Information

The Club

Nad Al Sheba Private Club operates under the umbrella of Sky Dive Dubai Club. It is located in Nad Al Sheba in the emirate of Dubai. The Club participates in activities on a local, national and international level. The Club offers recreational flying activities for its members for flying gyrocopters and light fixed-wing aircraft. The Club was granted approval by the General Civil Aviation Authority of United Arab Emirates (GCAA) under *Part II of the Civil Aviation Regulations – LSA*.

Training

Nad Al Sheba Private Club employed a dedicated training program described in the *Operation Manual*. The training program comprises of eight stages of training. As a part of stage 1, the trainee learns the pre-flight steps such as checking the weather. Lesson 7 in stage 1—*The Effect of Wind When Landing in A Straight Line*, included the following sub-topics:

1. Wind terminology
2. How to determine wind direction whilst flying.

Lesson 17 in stage 3 of training—*Flying at the Airfield*, included the following topics:

1. Landing in calm wind
2. Landing in crosswind
3. Landing in high wind components (headwind).

Lesson 12 in the training syllabus was dedicated to fly the circuit pattern and go-around. However, this lesson did not train the pilots on how to exit a circuit pattern and re-join it for landing on the other landing strip.

Analysis

Flight Planning

Analysing the weather information that was available to the Pilot, the Investigation found that the Pilot has planned the flight on the Accident day by relying solely on the METAR. The TAF report for both airports (OMDB and OMDW) showed a tailwind component that would have exceeded the Aircraft limit by five to eight knots during the flight time.

This information should have alerted the Pilot of the wind component which acted as a tailwind and increased the ground speed beyond Aircraft limitation for landing on landing strip 35.

This should have triggered the Pilot that landing on landing strip 35 would not be suitable and he should have considered landing on the opposite strip (landing strip 17) instead. Landing on 17 would have resulted in having a headwind, which would have reduced the landing distance required on the landing strip. The Investigation could not confirm if a thorough review of the weather before the flight was conducted appropriately by the Pilot.

Circuit Pattern Training

The Pilot joined downwind for landing on strip 35, he noticed that the wind was tailwind based on the windsock for the approach on landing strip 35. Despite that, the Pilot decided to continue approach.

In his interview, the Pilot repeated to the Investigation the statement that “If I had the same situation I will keep going around.” The Investigation concludes that the Pilot was unaware of the standard pattern exit technique and lacked the necessary knowledge and skill. The training was not sufficient to identify and improve this area.

Exiting a circuit pattern can be accomplished by one of two ways: Flying straight out on the runway heading for at least 2 nautical miles; or making a 45-degree turn in the direction of the traffic pattern once reaching 500 ft above ground



level (AGL).⁵ This is for the Pilot to re-join the circuit pattern for landing strip 17.

Engine Shutdown during Landing Roll

The technique which the Pilot applied for slowing down the Aircraft after touchdown, by holding the nose-up and applying brakes, was not a standard operating practice. The Pilot was not aware about the technique of shutting down the engine for deceleration despite that his technique was described in the *Pilot Operating Handbook*.

The nose-up attitude prevented the Pilot from maintaining direction and judging the remaining distance to the end of the landing strip, and impact the fence.

Conclusions

Findings

- (a) Nad Al Sheba Private Club was a licensed Club by the General Civil Aviation Authority of the United Arab Emirates (GCAA).
- (b) The Pilot held a valid LSA Pilot license with privilege of flying all gyrocopter aircraft, and he was medically fit.
- (c) The Pilot successfully completed the skill test that allows him to fly solo.
- (d) The training did not include techniques for how to exit the circuit pattern.
- (e) The wind component in METAR of OMDB and OMDW, that was reviewed by the Pilot, indicated four knots tailwind landing on landing strip 35 (at 0400 LT) while the departure of the Aircraft occurred later at 0700 LT.
- (f) Despite his statement that he reviewed the TAF, the Pilot elected to land on landing strip 35 disregarding the tailwind that brought the speed beyond the Aircraft limitations.

- (g) Although the Pilot felt the tail wind component and observed in flight, he continued the tailwind landing on strip 35.
- (h) The Pilot landed on landing strip 35 and attempted to reduce the ground speed by putting nose-up commands and applying brakes, which was a non-standard practice.
- (i) The nose-up attitude prevented the Pilot from maintaining direction and judging the remaining distance to the end of the landing strip, and impact the fence.
- (j) The Aircraft impacted the fence at the end of landing strip and flipped on the grass area after the fence.
- (k) The Aircraft sustained substantial damage.

Causes

The Air Accident Investigation Sector determines that the cause of the Accident was the impact of the Aircraft with a fence located at the end of the landing strip. The Aircraft over run the landing strip despite attempts to decelerate.

The non-standard technique applied by the Pilot to stop the Aircraft by nose up and brakes could not stop the Aircraft.

The nose-up attitude prevented the Pilot from maintaining direction and judging the remaining distance to the end of the landing strip, and impact the fence.

Contributing Factors

The Air Accident Investigation Sector identifies the following contributing factors to the Accident:

- (a) Lack of a thorough weather review by the Accident Pilot before the flight.

⁵ Federal Aviation Administration (FAA) publication, Airplane Flight Handbook (AFH), Chapter 7 Airport Traffic Patterns.



- (b) Lack of awareness of the consequences of flying in tailwind conditions beyond Aircraft limitation.
- (c) Lack of training on how to exit the circuit pattern and change to headwind direction.

Safety Recommendations

The Air Accident Investigation Sector recommends that:

Nad Al Sheba Private Club-

SR29/2021

Enhance the training and assessment methods to assure trainee pilots acquire competency for tailwind landings.

SR30/2021

Include the procedure of exiting the circuit pattern in the training syllabus, and improve the assessment methods for assuring pilots acquire competency for exiting circuit patterns when required.

This Report is issued by:

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