الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

Accident

- Summary Report -

AAIS Case Nº AIFN/0013/2019

Paramotor Ground Impact After Lift-off

Operator:	Paramotor Desert Adventures
Make and Model:	Z-Blade Paramotor
Nationality and Registration:	United Arab Emirates – No registration
Place of Occurrence:	Dubai - Margham
State of Occurrence:	The United Arab Emirates
Date of Occurrence:	23 November 2019

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 practice. 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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Accident Brief

AAIS Report No.: AIFN/0013/2019

Operator: Paramotor Desert Adventures

Aircraft Type: Z-Blade Canopy Paramotor

Registration: NA

MSN: NA

Number and Type of Engines: 1, AirConception

Date: 23 November 2019

Location: Margham, Dubai, UAE

Type of Flight: Leisure

Persons onboard: One

Fatalities: One

Investigation Process

The Accident involved a Z-Blade Paramotor was notified to the Air Accident Investigation Sector (AAIS) Duty Investigator (DI) at the Hotline Number (+971 50 641 4667), on 23 November 2019.

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). The accident subjected to this investigation
   - (Club). Paramotor Desert Adventures Club The flying club where the pilot had registered his paramotor and flown under its licence
   - (Investigation) The investigation into the circumstances of this Accident.
   - (Paramotor). The paramotor involved in this accident.
   - (Pilot) The pilot of the accident paramotor.
   - (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.

This Summary Report is adapted from Annex 13 Final Report structure, and shall be handled typical to handling a Final Report.

Factual Information

History of the Accident

On 23 November 2019, a Paramotor Pilot arrived at Paramotor Desert Adventures Club to conduct a leisure flight departing from the Club’s field. The Paramotor consisted of two main parts: A Z-Blade Canopy, and an Air Conception- Nitro-200 engine.

The Pilot registered electronically through a mobile application that serves as a check-in register log before reporting to the Club for the flight as per the Standard Operating Procedure and the statement of the General Manager. Once registered, the Pilot filed a declaration that he was fit to conduct the flight.

The flight was intended to operate in area OMR26 within the emirate of Dubai, which is the designated area for the Club flying activities as per the General Manager statement. The pilots use an application that serves as a navigational aid and a speed-measuring instrument. This application also enables the Club to locate a pilot who becomes lost or in case of emergency.

The General Manager stated that his presence is in line with the Club’s SOP which states that somebody from the Club shall be present at the Club at all times during flying operations acting as a Field Officer.

The General Manager stated that, being the Field Officer at time of the Accident, he had reported to the airfield as he was responsible for all radio communications with the pilots on the ground and in-flight and to ensure that they were cleared from the runway used by aircraft from another club.

He also provided the take-off and landing clearances as a part of his duties.

At 17:00 local time (LT), the Pilot started to prepare the Paramotor for flight. The preparations included a pre-flight inspection. As per the General Manager's statement, supported by a review of CCTV, the Pilot attempted to launch his wing once, but he did not feel comfortable, then he launched it for a second time, all the time facing the canopy, then he applied power and started his lift-off run at 17:03:23. The General Manager stated that facing the canopy is preferred by pilots for better visibility of the canopy and is practiced in moderate to higher wind conditions.

Figure 1. Aerial view of Club and the field

At 17:03:37, the Pilot lifted off from the airfield while adjusting his seat with one hand and holding the brake handles with the other hand. After lift-off, at 15 meters AGL, the Paramotor veered excessively to the right and adopted an attitude facing downwards towards the ground while travelling at high speed. The Pilot impacted the ground hardly and got non-conscious. The General Manager rushed to the site where he immediately cut off the engine power to ensure the safety of himself and other personnel around. The Pilot was transported to the hospital by helicopter. He passed away before arriving at the hospital.

Damage to Aircraft and Property

As a result of the impact with the ground, a Paramotor propeller blade was damaged on contact with the ground.

Figure 2. damage to the propeller blade resulting from the impact

The impact resulted in slight damage to the airfield surface. There were no injuries to other persons around the site of the Accident. The engine was in good condition and was demonstrated to be functional post-Accident by the General Manager.

Personnel Information

The Pilot had been trained at the Club where the Accident occurred. He had a total of 57 hours of training.

According to the Club SOP, during the training phase, trainee pilots must only be cleared for flying after successfully completing a test. According to the General Manager's statement, the training standards used by the Club are the standards adopted by the European Union Aviation Safety Agency (EASA). However, the Club issues only certificates not license, as per the General Manager's statement.

Having completed the training requirements, the Pilot had registered himself as a visiting pilot at the Club for regular flying. The General Manager stated that the Pilot was flying three types of paramotors regularly and the Accident Paramotor is one of these types. In addition, the Pilot was flying from several locations in the United Arab Emirates. It was not possible to confirm how many total hours he had flown.

Before the flight, the Pilot declared himself fit for duty through the application on his smartphone designated for that purpose. Also, the autopsy referred the cause of death to the impact and did not reveal any sign of psychoactive substance that could have adversely affected the Pilot performance.

Paramotor Information

Paramotor, also known as powered paraglider, is a category of aircraft that flies in a manner that is unique among light sport aircraft. The machine consists of the paraglider's wing, engine, frame with cage, pilot harness, propeller and accessories carried in-flight.

The paramotor engine, when at the full power setting, generates a torque which causes it to veer to the right. However, the engine includes a built-in engine torque compensation installation which reduces this torque to a negligible level called 'residual torque'. This residual torque requires minimal counter action from the pilot. The General Manager demonstrated a takeoff at full power with the same configuration that the Accident Pilot applied on his Paramotor. The Investigation found

that the residual torque is minimal and requires no installation to be made to counter it.

The paramotor is configured similarly to a pendulum, and the wing must be inflated and pressurized for each takeoff. The wing is connected to the paramotor via risers and suspension lines and flies at a relatively constant speed. Pilots change the speed of the paramotor by adjusting the position of the trim on the rear risers, or by pushing down on the speed system on the front riser by means of a bar with lines that the pilot rests his feet on.

Figure 3. Paramotor engine

Using brake lines and brake handles is the primary method for turning the wing during flight. It is also the primary method to control the glider on the ground. The Pilot used his left and right brake handles to control the direction of the Paramotor. Pulling the left hand side brake handle causes the trailing edge of the left-wing to deflect downwards causing drag on this side. This deflection caused the Paramotor to turn to the left. The opposite was true to turn to the right.

The paramotor's flight controls comprise of brake handles, trims, stabilizer lines, a speed bar and the tip steering lines. The lines are colour coded to indicate which line set they belong to, typically one colour for either A, B, C, D and the brake lines for easy recognition and to prevent confusion from the pilot.

The parachute preparation was in reverse position as per General Manager's statement. It is a standard method as outlined in the SOP, and it is called reverse position because the pilot faces the canopy.

Airfield Information

The Club uses a designated area for its flying activities. The flying area is referred to as area OMR26 which is located in the emirate of Dubai. Takeoffs and landings are conducted from a grassy field that is surrounded by sand dunes. All flying activities require the permission of the Field Officer as outlined in the SOP.

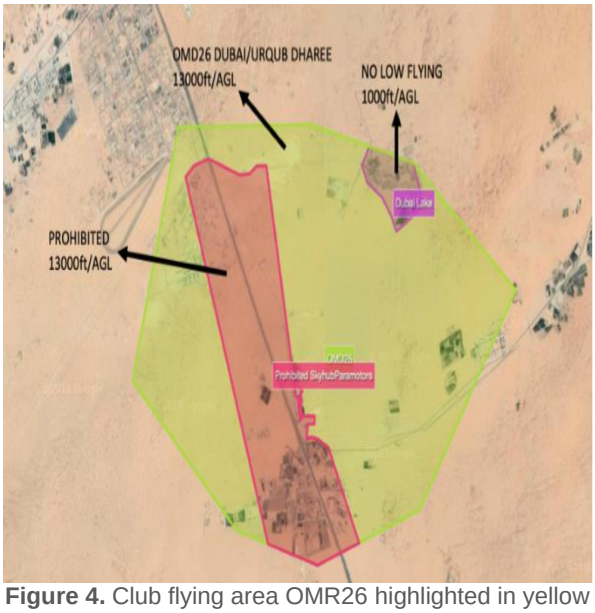

Figure 4. Club flying area OMR26 highlighted in yellow

Weather Information

The weather information was checked through the noaa.gov website[1] by inserting the identification of Dubai International Airport and Dubai World Central Airport as the club has no weather station installed. Weather checking is done by the General Manager, and declaring if it is OK to fly or not is based on weather data obtained in accordance with Club's procedure. In the Accident day, the weather was within limits for a paramotor operation.

[1] The National Oceanic and Atmospheric Administration (NOAA) is an American scientific agency within the United States Department of Commerce that focuses on the conditions of the oceans, major waterways, and the atmosphere.

Organizational and Management Information

History of the Club

Paramotor Desert Adventure of Dubai is an extension of Skyhub Paramotors which was established in 2013 to serve as a paramotor sports hub. The Club operates under a No Objection Letter that was issued by Dubai Civil Aviation Authority (DCAA) to operate as newly established aviation club as per the document. DCAA was established as an autonomous body by the decree and proclamation of Law No. (21) of 2007, to undertake development of air transport industry and to oversee all aviation related activities in Dubai.

Paramotor flying falls under Light Sport Aircraft activities (LSA).[2] As outline in *Civil Aviation Regulations Part II- Chapter 10- Light Sport Aviation Activities,* in order for the Operator to be approved by the GCAA for such activities the following shall be met:

1. Acceptance of the concerned authority.

2. The club shall be registered as an establishment or a company entirely owned by UAE national(s).

3. Security Clearance for the organisation, members, and users.

4. An organisational chart that includes the following designations: An Accountable manager, operations manager, maintenance manager and a safety and security officer in addition to clear working plan.

5. An operation manual which includes internal policies, procedures, roles and responsibilities related to the club

6. A service catalogue for the services delivered to members along with the fees

7. Light sport aviation activities training manual.

8. Appropriate facilities and equipment to ensure safe operations including operations room.

9. Fulfilment of the commissioning and operational requirements stipulated in this regulation.

According to *Civil Aviation Regulations Part II- Chapter 10- Light Sport Aviation Activities,* a pilot who wishes to practice light aviation activities, shall be registered in a GCAA- approved club. The pilot shall apply for a security clearance as a pre-requisite for flying. After granting security clearance, the applicant goes for training and a skill test before been issued a Permit to Fly.

For enforcing this requirement, the GCAA coordinates with the local emirate police. Paramotors under this regulation shall be equipped with certain devices for measuring speed, altitude, and global positioning.

According to GCAA oversight system, light sport activities shall be audited annually. However, because Paramotor Desert Adventures Club is not registered and approved by the GCAA the oversight system will not be applicable.

Ground support

As per the SOP, the Club prohibits any flying- as if no Field Officer is present all time to supervise the flying activity.

The SOP outlines the responsibilities of the Field Officer as follows:

- Designation of an area to test/prepare the gear.
- Designation of take-off and landing area.
- Provide clearance to pilots during flying to enter the circuit of the club.
- Provide landing clearances.
- Maintaining radio contact with pilots at all times during flight.

Before reporting to the Club for flight, the Accident Pilot registered through an application that serves as a registration log. Then, the Pilot called the Club to ensure that the Field Officer

[2] LSA activities: recreational aerial activities practiced using Light sport aircraft or Remote control aircraft. [CAR Part II – Chapter 10 - LIGHT SPORT AVIATION ACTIVITIES]

would be available as per the General Manager's statement.

The Field Officer- who was the General Manager at the time of the Accident- was available on the field to supervise the flying activity.

Training

The Pilot had completed more than 50 hours of training prior to being certified. This had been done in the same facility that the current Club is using but under a different name.

The Pilot was granted a certificate by his former club after successful completion of the training phase. The Pilot's training records showed that he was trained on several areas such as: adjusting the seat on the ground, countering engine torque, stowing brake handles, and getting seated.

SOP for Countering Residual Torque, Seat Adjustment, Getting Seated and Brake Handles Stowage

Before conducting the flight, the Pilot may have adjusted his Paramotor engine to eliminate residual torque. One way to counter it – as stated in the SOP- is to use risers that have a double attachment point for the carabineer. The wing would be attached to the lower attachment point on the side toward which the torque will deflect the machine.

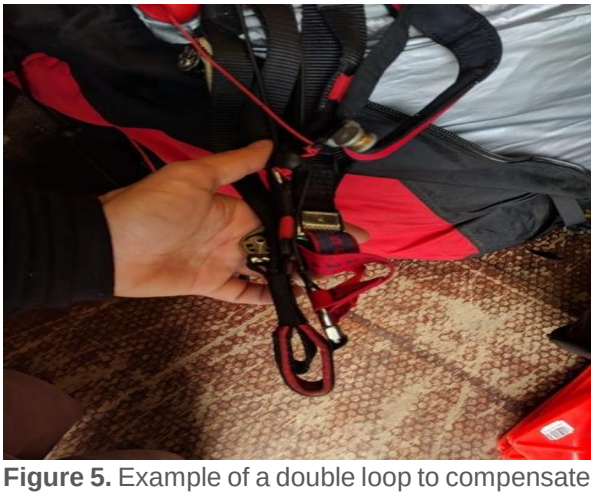

Figure 5. Example of a double loop to compensate torque

Another method of eliminating residual torque – as per the SOP- is by opening the trims slightly on the side affected by the residual torque to allow the wing to fly faster on that side. However, the General Manager has demonstrated two takeoffs, one with right trim opened and one with both trim fully closed.

Figure 6. Both trims were equally trimmed for the accident flight

As per the General Manager statement, seat adjustment needs to be done on the ground before takeoff as part of pre-flight checks. He also stated that the pilots are trained on seat adjustment during their initial training. The training records of the Accident Pilot showed that he had successfully completed his Paramotor training course, which included seat adjustment training, in December 2016.

To get seated, the General Manager stated that trainee pilots are made aware during training, that a minimum height of +20 meter should be attained before getting seated. Getting in the seat earlier does not pose a serious risk but keeping the legs down at lower altitude is good practice in case the engine stopped and a quick landing becomes imminent.

During the training, it is also conveyed with significance that, if the pilot is facing trouble to get properly seated, it doesn't harm to stay in hanging position, go around and just come back in for landing.

However, if the pilot still decides to get seated in the air, the brake handles need to be stowed on the magnet clips first before using hands in order not to bring the wing in a turning motion or the pilot may place the brake handles in one hand holding them front of his nose and use his freehand to get into his seat although. The latter is not practiced as a standard practice in the Club and students are not encouraged to use it as per the General Manager statement. This can be used for Paramotoring and winch flying as well. The paramotor manual states that the pilot shall get to a safe altitude of 20 meters above ground before getting seated.

Analysis

Adjusting the seat during pre-flight checks

Seat adjustment is required to be done on the ground before conducting the flight as part of pre-flight checks and the Pilot had received training on

2016 about these checks. However, the Pilot had not followed what he was trained on for seat adjustment in this flight. This was probably because the Pilot did not carry out the seat adjustment before the flight on the ground. The Investigation could not determine why the Pilot did not implement the seat adjustment checklist item.

The Field Officer role did not include his involvement in ensuring that pre-flight checks are conducted appropriately. Having that scope expanded, the involvement of Field Officer may have detected the error of omitting the seat adjustment.

Residual Torque

After an initial failed wing launch, the Pilot attempted a second launch and he set engine power to full. Putting the engine to full power on this engine generates a negligible veer to the right as a result of residual torque. To counter such an effect, an adjustment in a form of riser's installation can be applied, or the trim on the side can be slightly opened to reduce the residual torque. The Investigation verified that no risers were installed to counter residual torque, nor the trims on the side were slightly opened to reduce it.

The General Manager demonstrated two takeoffs: one with right trim opened; and one with both trim fully closed. It was found that the residual torque was not significant and did not affect the Paramotor controllability if left unadjusted. Although the application of this technique may be beneficial in counteracting the slight residual torque, this benefit may be outweighed by the effort that paramotor pilots need to pay for controlling the paramotor.

The Investigation found that residual torque was not a factor in the Pilot losing control of the Paramotor.

SOP of Controllability

Paramotors are comprised of risers, brake handles, trims, stabilizer lines, a speed bar and wingtip steering lines. However, the steering manoeuvre is primarily conducted by means of brake lines and brake handles. Pulling the left brake handle causes the trailing edge of the left wing to deflect downwards inducing drag on that side. This deflection causes the paramotor to turn to the left. As per the SOP, brake handles are always kept in the respective left and right handles during takeoff and could later be stowed on their respective magnetic holders. The SOP stated that it is good to have the brake handles held in one hand in front of pilot's nose and using the other hand to get seated.

The Accident Pilot did not adhere to the SOP guidance related to positioning the brake handles in front of his nose. Instead, he pulled excessively the right brake handle towards the left and beyond his nose as per the General Manager's statement and the CCTV recording. That caused the Paramotor to veer excessively to the right. The Pilot excessive pulling of the brake handle beyond his nose was overlooked by the Pilot who was mentally occupied on seat adjustment and getting himself seated immediately after lift-off, as he leaned to the right to adjust it.

This led the Pilot to be distracted from controlling the Paramotor which was brought to a steep turn attitude until diving toward the ground. The Pilot had no room to recover the Paramotor as he attempted to adjust his seat and to get seated at a very low height in which the SOP states that it is recommended to be at least 20 meters or above. The Investigation found that the action of the Pilot of pulling excessively the brake handles stemmed from the non-adherence to seat adjustment procedure which shall have been done on the ground and his rush to get seated below the recommended height of 20 meters as stated in the SOP.

Field Officer Role

The General Manager was the Field Officer during the Accident day. He stated in the interview that assistance over the radio is offered mainly to the trainee pilots, while experienced pilots usually are not guided on the radio.

The Investigation reviewed the Field Officer responsibilities in the SOP and found that the SOP does not distinguish between trainee pilots and experienced pilots in terms of providing Field Officer support. The written SOP explicitly requires the Field Officer to provide assistance and to regulate the flying activity on the ground and in-flight.

However, the current duties of the Field Officer outlined in the SOP lacked supervisory duties, and the responsibilities did not require him to ensure that pilots are adhering to the SOP during pre-flight stage.

The Investigation sees that expanding the role of the Field Officer to include the check of pilots adherence to SOP, especially during pre-flight, could have probably created a barrier to detect

such an error from the Accident Pilot and prevent it.

Conclusions

Findings

(a) Paramotor Desert Adventures Club conducted operations under a *No Objection Letter* issued by Dubai Civil Aviation Authority (DCAA).

(b) The Pilot was medically fit.

(c) There were no indications that the Paramotor has any mechanical defects that could have affected its safe operation.

(d) The weather at the time of the Accident was within limits for Paramotor operations.

(e) The Field Officer was present at the Club during the Accident

(f) The Pilot did not follow SOP for seat adjustment on the ground.

(g) The Pilot was distracted from controlling the Paramotor as a result of not following SOP for seat adjustment on the ground and his attempt to get seated was below the recommended height.

(h) The Paramotor veered excessively in steep turn and downward facing attitude and impacted the ground at high speed.

(i) The test flight conducted by the Owner, during circumstances similar to the Accident flight, under the supervision of the Investigation, revealed that residual torque was not significant enough to cause uncontrollable veer of the Paramotor.

Causes

The Air Accident Investigation Sector determines that the cause of the Accident was loss of control due to inconsistent control input that stemmed from non-adherence to SOP of seat adjustment on the ground, and the attempt of the Pilot to get seated below the recommended height.

Contributing Factors

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

(a) The narrow scope of Field Officer's role.

(b) Lack of periodic refresher training.

Safety Recommendations

The Air Accident Investigation Sector recommends that Paramotor Desert Adventures Club:

SR 23/2021

Approach the General Civil Aviation Authority (GCAA) for appropriate approval in accordance with Civil *Aviation Regulations Part II- Chapter 10- Light Sport Aviation Activities*

SR 24/2021

Expand the Field Officer's role and responsibilities to include safety assurance on the ground and document them in the SMS manual.

SR 25/2021

Conduct a comprehensive risk assessment for pre-flight checks on the ground in relation to current pre-flight checklist.

This Report is issued by:
Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates

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