الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

Air Accident Investigation Sector

Accident

- Summary Report -

AAIS Case Nº AIFN/0012/2016

Forced Landing

Operator:	Jazirah Aviation Club
Make and Model:	Aeroprakt-22L
Nationality and Registration:	The United Arab Emirates, A6-XGG
Place of Occurrence:	Al Marjan Island, Ras Al Khaimah
State of Occurrence:	The United Arab Emirates
Date of Occurrence:	4 October 2016

Investigation Objective

The Investigation was performed by the Air Accident Investigation Sector (AAIS) pursuant to the UAE *Federal Act No. 20 of 1991*, promulgating the *Civil Aviation Law, Chapter VII- Aircraft Accidents*, *Article 48*. It is in compliance with the *Civil Aviation Regulations (CARs), Part VI Chapter 3*, in conformity with *Annex 13 to the convention on International Civil Aviation*, and in adherence to the *Air Accidents and Incidents Investigation Manual*.

The sole objective of this Investigation is to prevent aircraft accidents and incidents. It is not a function of the AAIS to apportion blame or determine liability.

This Summary Report is made public at:

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

Investigation Process

The occurrence involved a sport light aircraft Aroprakt-22L, registration A6-XGG, and was notified to the AAIS Duty Investigator (DI) by phone call to the Hotline Number (+971 50 641 4667).

After the Initial/On-Site Investigation phase, the occurrence was classified as an '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:
    - (Aircraft)- the aircraft involved in this accident
    - (Investigation)- the investigation into the circumstances of this accident
    - (Accident)- this accident referred to on the title page of this report
    - (Report)- this accident summary report
    - (Pilot)- the pilot of the accident flight
    - (Club)- Jazirah Aviation Club (operator of the aircraft)
    - (Operations)- the operations department in the Club.
2. Unless otherwise mentioned, all times in the Report are local time (UTC was local time – (minus) 4h).
3. 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.
4. The structure of this Summary Report is an adjustment of the Final Report format depicted in *Annex 13.* This adjustment is made to suit the investigation into this Accident.

Factual Information

History of the Flight

On 4 October 2016, at approximately 1720 United Arab Emirates (UAE) local time (LT), an Aeroprakt-22L fixed-wing light sport aircraft (LSA), registration mark A6-XGG, owned by Jazirah Aviation Club, conducted a pleasure flight in Ras Al Khaimah area. There were two persons on-board; the Pilot and a passenger.

Before 1700 LT, the Pilot decided to have a 10 to 15 minute pleasure flight with the passenger. At approximately 1700 LT, preparation for the flight, which involved cleaning the windshield, checking the engine oil, refuelling, and pre-flight checks were performed. The Pilot also reviewed the weather forecast (METAR[1]) for OMRK[2] which was printed and available in the Club Operations Office. OMRJ[3] had no facility providing weather forecast.

At approximately 1720, the Aircraft took off from OMRJ runway 34. Since OMRJ is an uncontrolled airspace aerodrome, the Pilot broadcast his intention during the takeoff.

After approximately 10 minutes flying time, the Club contacted the Pilot requesting him return to the aerodrome and land the Aircraft as soon as possible because the weather was changing. While the Aircraft was in the Al Hamra area on its return to OMRJ, the Club Operations requested the Aircraft position, and requested the Pilot to expedite the landing. The Pilot provided his position and stated that he would expedite the landing. Runway 28 was given for the landing by the Operations.

When the Aircraft was flying about 2.8 kilometers (km) (1.5 nautical miles) north of OMRJ, the Operations asked whether the Pilot had the runway in sight, and he replied “negative”. The Pilot stated that the weather front was moving towards the Aircraft, and that visibility was less than 1 km. The Pilot decided to approach closer to the aerodrome in an attempt to identify a familiar landmark and to use this reference to see the runway and land.

As the Aircraft approached the aerodrome, the Pilot was unable to identify a landmark or see the runway. The Pilot stated that there were a considerable number of electric power lines surrounding OMRJ. Therefore, when the Aircraft was approximately at 400-500 feet above ground level (AGL), he decided not to descend further, and he called the Operations advising that he would divert and land the Aircraft at Marjan Island, since he was aware that there were many open areas.

The reported wind obtained from the Operations was between 280 and 160 degrees.

When the Aircraft was flying over Marjan Island, the Pilot performed one orbit looking for the landing site. He identified a sandy area where car tire marks were visible, and he decided to land at that location. He estimated that the length of the selected location was sufficient for the landing.

After deciding on the landing site, the Pilot flew the Aircraft on a right downwind. The Pilot maintained the downwind as he identified electrical pylons on the approach path of the final leg and he considered these to be obstacles. After flying a long downwind leg, the Pilot performed a right turn to base leg and the flaps were set to the first position, and then he continued the right turn to the final leg.

In the approach on final, the Aircraft flew over the electrical pylons and the glide path was then increased to bring the Aircraft onto the touchdown point as planned by the Pilot. During the approach, the Aircraft experienced a headwind and a small crosswind component. The wind speed was between 15 and 20 knots, as estimated by the Pilot.

On landing, the Aircraft was on a heading of approximately 310 degrees, the airspeed was about 100 km per hour. The landing was uneventful. As the Aircraft decelerated on the landing roll, the Pilot realized that there was a ditch in front of the Aircraft, and that the Aircraft would not stop before reaching the ditch. Preparing for the impact with the ditch the Pilot ensured that he and

[1] Meteorological Terminal Air Report (METAR) is a format for reporting aviation routine weather information of aerodromes. The information is normally given hourly (current weather observation)

[2] ICAO Code for Ras Al Khaimah International Airport

[3] ICAO Code for Al Jazirah Airport

the passenger were properly restrained by the harness and that they had positioned themselves with their backs supported by the seatbacks.

There were two ditches in front of the Aircraft as shown in figure 1. The Aircraft entered the first ditch which had a depth of about 80 centimeters, and it then continued into the second ditch which had a depth of approximately 130 centimeters.

Figure 1. Ditches (↑ first ditch, ↑ second ditch)

As the Aircraft entered the second ditch, it turned over slowly and came to rest in an upside-down position, as shown in figures 1 and 2.

Figure 2. Aircraft final position

The distance between the touchdown point and the point where the Aircraft came to rest was approximately 177 meters, as shown in figure 3.

Figure 3. Off-field landing site (↑ first ditch, ↑ second ditch)

Figure 4 shows the area of OMRJ aerodrome and the selected off-field landing site.

Figure 4. OMRJ and the off-field landing site

The Accident occurred approximately 15 minutes before the sunset.

There were no injuries to the Pilot or passenger.

Damage to Aircraft and Property

As a result of the occurrence, the Aircraft was damaged beyond repair.

There was no damage to property, or the environment.

Personnel Information

The Pilot had a fixed wing ultralight/microlight pilot permit from the Club, with permission to carry a passenger. The permit had a two-year validation expiring on 9 June 2017.

Aircraft Information

The Aircraft was an AEROPRAKT-22L (A-22L) light sport aircraft, and the serial number was 220. The Aircraft was manufactured in 2007 by Aeroprakt, Ukraine. The time since new was 95.5 hours.

The AEROPRAKT-22L (A-22L) is a two-seat, high-wing strut braced monoplane of "classic" aerodynamic layout with a closed cockpit, non-retractable landing gear with a nose wheel. The Aircraft was powered by a Rotax-912 engine with a tractor three-blade adjustable pitch propeller located in the nose of the fuselage.

The installed engine serial number was 5848828. The time since new of the installed engine was 95.5 hours.

The records of airframe and engine maintenance and inspection provided to the Investigation showed no technical defects prior to the Accident, nor any mechanical anomaly prior to take-off.

According to the *Flight Manual*, the stall speed of the Aircraft with flaps set to the second position at maximum take-off weight, and with the engine at idle is equal to 60 km per hour. With the flaps in the first position the stall speed is 65 km per hour, and with retracted the flaps retracted the stall speed is 70 km/h. The wind limitation of the aircraft is 10 meters/second (19.5 knots) for a headwind, and 4 meters/second (7.8 knots) for a crosswind. It is not recommended to extend the flaps with a headwind of more than 8 meters per second (15.6 knots).

According to the *Flight Manual*, after entering into the final approach, the throttle is set to idle and the descent is flown at a speed of 90-100 km/h. When windshear is expected, the approach must be performed at a speed of 100 km per hour minimum.

Meteorological Information

The weather information used for OMRJ was the METAR for OMRK. The OMRK METAR over the period 1700 and 1800 LT (1300 and 1400 UTC) on 4 October 2016 is given in table 1.

Table 1. METAR and the description

OMRK 041400Z 20016KT 2000 BLDU FEW040 28/20 Q1008 A2977	
Time	1400 UTC
Wind	200 degrees / 16 Knots
Visibility	2,000 meters
Clouds	Few (1-2 oktas) at 4,000 feet
Air Temperature	28 degrees Celsius
Dew Point	20 degrees Celsius
Pressure (Altimeter)	1008 millibar / 29.77 inch of mercury
Condition	Blowing widespread dust

OMRK 041340Z 19020KT 1000 BLDU FEW040 29/19 Q1008 A2977	
Time	1340 UTC
Wind	190 degrees / 20 Knots
Visibility	1,000 meters
Clouds	Few (1-2 oktas) at 4,000 feet
Air Temperature	29 degrees Celsius
Dew Point	19 degrees Celsius
Pressure (Altimeter)	1008 millibar / 29.77 inch of mercury
Condition	Blowing widespread dust

OMRK 041300Z 17004KT 9999 FEW040 32/17 Q1006 A2972	
Time	1300 UTC
Wind	170 degrees / 4 Knots
Visibility	10 kilometers or more
Clouds	Few (1-2 oktas) at 4,000 feet
Air Temperature	32 degrees Celsius
Dew Point	17 degrees Celsius
Pressure (Altimeter)	1006 millibar / 29.72 inch of mercury
Condition	---

Sunset time was at 1800 LT.

Aerodrome Information

OMRJ is a private aerodrome operated by the Jazirah Aviation Club and it is located near Al Jazirah Al Hamra, Ras Al Khaimah. The aerodrome has two runways, Runway 16/34 and 10/28.

Organizational and Management Information

Operations Approval

Jazirah Aviation Club was authorized to operate its aircraft only within the approved area as mentioned in the GCAA Operating Approval Reference number 24960/1257 dated 18 December 2000.

The approved area was within tangents joining circles of three nautical miles centered on Jazira Al Hamra and Saqr Field aerodromes, and to the north and north-east of northern boundary of Ras Al Khaimah Control Zone extended to the East until UAE-Oman border, but excluding Ras Al Khaimah Control Zone.

The approved vertical limitation was from the surface to 1,400 feet above ground level (AGL).

The Club had a total of 65 light sport aircraft, of which five 5 aircraft belonged to the Club, and the rest belonged to individuals. All the aircraft were A6-registered.

Operations Manual

Section 1 of the Club's *Operations Manual* prescribes the general operations requirements for the Club's activities. Under paragraph 1.12, the requirements for carriage of passengers are given, as follows:

> **"**Pilots in command may carry passengers in two place aircraft subject to the CFI's approval and subject to the limitations of their license. Nevertheless, permission to carry a passenger in an aircraft may be withheld any time at the discretion of the Chief Flight Instructor or his delegate. …**"**

Section 3 of the *Manual* prescribes the route requirements for its activities. Under paragraph 3.2, the requirements for flight planning including checking the weather are given, as follows:

> **"…** Check the weather actual reports and forecasts are above the club minima for all stages of the flight (weather minima are included further on in this Section). …"

Under paragraph 3.3, the requirements for weather minima are given, as follows:

"No flight shall be conducted:

- If the visibility is below 5KM and the cloud base is below 1500 FEET.
- If the wind conditions seem to exceed 35 Km/h.
- If weather warning has been issued on the METAR/TAF for the day.

Particular attention should be given to the sections dealing with hazards such as:

- Turbulence
- Downdrafts."

Under paragraph 3.7, the requirements for off-field landing are given, as follows:

> **"**A precautionary landing at a non-prepared site may be performed at pilot's discretion in order to avoid unexpected weather, in case of severe illness of the pilot or a passenger, or if technical defects are suspected, for example sudden and severe rotor vibrations.
>
> - Select a suitable landing site from safe altitude, considering slope, wind speed and direction.
> - Fly a reconnaissance pattern to check for obstacles, especially power lines, wires, and cables in the approach and go-around path
> - Overfly the landing site to check for obstructions such as fences, ditches, rocks, height of vegetation, and select most suitable touch-down zone.
> - Perform a normal approach and touch-down into wind with minimal ground speed."

Regulatory oversight of the Club was a responsibility of the UAE GCAA.

Additional Information

UAE Civil Aviation Requirements

Part II, Chapter 10 of the UAE *Civil Aviation Regulations – Light Sports Aviation Activities (LSA)*, prescribes the requirements for light sport aircraft activities. A pilot is permitted to carry passenger which is in accordance with Article (5) and) of UAE *CAR Part II Chapter 10 – Conditions*

for Flying Club Approval, and its guidance material (GM) to Article (5).

Analysis

Preparation of the Flight

Inspection of the general condition of the Aircraft was performed during the pre-flight check which was in accordance with the Club's *Operations Manual*. The Pilot stated that he also checked the weather (METAR from OMRK), however, most probably he considered that he would not encounter the weather since he planned to perform the takeoff at 1720 LT and would have a flight duration of only 15 minutes.

Based on the METAR, a reduction of visibility to 1,000 meters and blowing widespread dust were expected at 1740 LT, and in fact the Pilot experienced the reduced visibility down to less than 1,000 meters due to widespread blowing dust.

As mentioned in the *Operations Manual*, no flight shall be conducted if a weather warning has been issued on the METAR/TAF[4] for the day. In this case, since there was a weather warning, the Pilot should not have performed the flight.

The Pilot stated that, after 10 minutes in the air, he received a call from the Club's Operations asking him to return to base as soon as possible because the weather was changing. Most probably, the weather had started to change at about 1730 LT, which was 10 minutes ahead of the forecast, as given by the METAR. The Investigation found that the Pilot believed that the change in the weather would not occur during the flight.

Diversion and Forced Landing

The diversion decision was made after the Pilot had attempted to land at OMRJ. However, he was not able to return to OMRJ due to poor visibility, and he decided to perform an off-field landing (diversion) at Marjan Island.

When selecting the landing site in Marjan Island, the Pilot performed the following required actions: He flew the Aircraft from a safe altitude while selecting the landing site; After the Pilot recognized car tire marks at a site, he decided to select that landing site with the assumption that the surface at that site would be firm enough to support the Aircraft; Then, the Pilot checked for obstacles such as power lines, poles, etc. There was a row of electrical pylons on the final approach path which caused him to extend the downwind leg before he turned the Aircraft onto base leg, so that the Aircraft would have a longer distance on the final approach in which to adjust the approach path.

Although it was windy, and the visibility was limited, the landing was uneventful until the time when the Pilot was surprised by the first ditch. The Investigation believes that the Aircraft was already close to the edge of the first ditch when the Pilot realized that there was a ditch in the selected landing area. The Pilot did not use maximum brake to stop the Aircraft before it reached the first ditch.

Since the landing site was a sandy area, even had the surface been firm enough, the Pilot, most probably, considered that the use of maximum braking should be avoided as this might have put a heavy load on the nose wheel and might have cause the nose wheel to dig in, and lead to the Aircraft turning over. Had this condition occurred, it might have led to worse consequences than those that actually happened.

The Investigation believes that the forced landing at Marjan Island was rushed as the time was close to sunset and the weather was changing to windy conditions and poor visibility. Because of these challenging conditions, the Pilot, most probably, did not overfly the landing site, and as a result, he did not notice the ditches. The distance from OMRJ to the off-field landing site was about 5 km, and the Investigation believes that the weather at the landing site may have had better visibility, but apart from this, the weather at the landing site was little different than that at OMRJ.

The Aircraft *Flight Manual* specifies a speed of between 90 and 100 km per hour for descent on final approach. The stall speed was 65 km per hour with first position flap setting.

The Pilot stated that the Aircraft touched the ground at approximately 100 km per hour. If the Pilot slowed the Aircraft to 90 km per hour in the

[4] Terminal Aerodrome Forecast (TAF) is a format for reporting aviation routine weather information of aerodromes. The information is normally given every six hours (predicted weather in the near future)

descent on final, and reduced the speed on the final approach before touchdown, but to not less than 81 km per hour (1.3 times the stall speed), the Aircraft may have stopped before the edge of the first ditch. However, since the weather was windy, which was not in Pilot's favor, he chose a speed of 100 km hour for, most probably, expected recovery from any windshear effects.

The headwind speed was between 15 and 20 knots on the final approach as estimated by the Pilot. The Pilot set the flaps to the first position for the landing, which was not recommended according to the *Flight Manual*. Although the flap setting used was not a contributing factor to the Accident, the Investigation recommends that the Club ensures its pilots strengthen their knowledge of the limitations of the aircraft they fly.

Had the Pilot not been subjected to time pressure, and had he overflown the landing site in accordance with the Club's procedure, he may have identified the ditches and consequently chose a different off-field landing site.

Considering the evidence and the resulting analysis, the Investigation believes that the Pilot selected an undesirable off-field landing site, which resulted in a shorter available clear landing distance than that actually required.

No evidence was provided to the Investigation indicating that the Pilot was suffering from fatigue, or any physical or psychological effect that could have contributed to the Accident.

There were no abnormalities of the flight controls, steering or brake systems prior to the Accident.

Conclusions

Findings

(a) The Aircraft was certificated, equipped and maintained in accordance with the existing requirements of the *Civil Aviation Regulations* of the United Arab Emirates.

(b) The Aircraft was airworthy when it was prepared for the flight before the Accident.

(c) The Pilot did not expect that the forecast weather change would occur during the flight.

(d) The Pilot was not able to return to the departure airport due to widespread dust and poor visibility, consequently he decided to carry out off-field forced landing at Marjan Island.

(e) The forced landing was rushed as the weather was becoming windy with poor visibility, and sunset was approaching.

(f) The Pilot performed a precautionary off-field landing actions, but he did not overfly the landing site.

(g) The Pilot did not observe two ditches in the selected landing area.

(h) The landing was uneventful until the Pilot was surprised by the first ditch.

(i) The Pilot did not apply maximum braking to stop the Aircraft before reaching the first ditch because of his consideration that the nose wheel would dig into the sand causing Aircraft turn over.

(j) The Aircraft continued its landing roll and entered the second ditch where it turned over slowly and came to rest in an upside-down position.

(k) Neither the Pilot nor the passenger sustained injury.

(l) The Aircraft was damaged beyond repair.

(m) The Pilot was not suffering from fatigue or any physical or psychological effect that could have contributed to the Accident.

Causes

The Air Accident Investigation Sector determines that the cause of the Accident was the decision of the Pilot to conduct a flight in adverse weather conditions that was not in accordance with the published limitations of the *Operations Manual*.

Contributing Factors

The Air Accident Investigation Sector determines that contributing factor to the Accident was the inappropriate selection of the off-field landing site as the Pilot did not carry out the required overflight site exploration due to time pressure as the weather conditions were rapidly changing and sunset was approaching. Accordingly, the Pilot was unable to identify ditches located in the selected forced landing area, which added to the severity of the Accident in terms of Aircraft damage.

Safety Recommendations

The Air Accident Investigation Sector recommends that:

Jazirah Aviation Club-

SR01/2017

Ensures adherence to weather minima procedures by all pilots, as required in the *Operations Manual*.

SR02/2017

Ensures adherence to the precautionary off-field landing actions procedures by all pilots, as required in the *Operations Manual.*

SR03/2017

Ensures that all pilots have the full knowledge of the limitations of the aircraft they fly in accordance with the Manufacturers' *Flight Manual*.

The General Civil Aviation Authority (GCAA) of the United Arab Emirates-

SR04/2017

Evaluates the flight operations culture of the Jazirah Aviation Club pilot body, especially regarding adherence to basic aircraft operating instructions.

This Report is issued by:

Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates

Fax: +971 2 4491 599
Email: aai@gcaa.gov.ae
Website: www.gcaa.gov.ae