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**AAIA**

Air Accident Investigation Authority



# **Collision with Obstacle During Landing**

## **Investigation Report**

**Serious Incident to  
Geronimo<sup>2</sup> M-27 Paraglider  
Sai Kung, Hong Kong  
28 April 2020**

**06-2022**



# AAIA Investigations

Pursuant to the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Cap. 448B), the sole objective of the investigation and the Investigation Report is the prevention of accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

The Chief Inspector ordered an inspector's investigation into the serious incident in accordance with the provisions in Cap. 448B.

This serious incident investigation report contains information of an occurrence involving a Geronimo<sup>2</sup> M-27 Paraglider on 28 April 2020.

The Hong Kong Police Force (HKPF), the Hong Kong Observatory (HKO), the Civil Aviation Department (CAD) and the Hong Kong Paragliding Association (HKPA) provided assistance to the investigation.

Unless otherwise indicated, recommendations in this report are addressed to the regulatory authorities of the State or Administration having responsibility for the matters with which the recommendation is concerned. It is for those authorities to decide what action is taken.

This Investigation Report supersedes all previous Preliminary Report and Interim Statements concerning this serious incident investigation.

All times in this Investigation Report are in Hong Kong Local Times unless otherwise stated.

Hong Kong Local Time is Coordinated Universal Time (UTC) + 8 hours.

Chief Accident and Safety Investigator

Air Accident Investigation Authority

Transport and Logistics Bureau

Hong Kong

September 2022

<b>Date and time:</b>	28 April 2020 at 1507 hours	
<b>Occurrence category:</b>	Serious Incident	
<b>Primary occurrence type:</b>	Collision with Obstacle during Landing	
<b>Location:</b>	Sai Kung, Hong Kong	
<b>Position:</b>	22 ° 23' 04" N 114 ° 16' 18" E	
<b>Manufacturer and model:</b>	Geronimo <sup>2</sup> M-27 Paraglider	
<b>Serial number:</b>	G <sup>2</sup> M 2276	
<b>Registration:</b>	Nil	
<b>Year of manufacture:</b>	2017	
<b>Type of operation:</b>	Private	
<b>Persons on board:</b>	Crew – 1	Passengers – 0
<b>Injuries:</b>	Crew – Minor injury	
<b>Paraglider damage:</b>	Minor	
<b>Pilot's licence details:</b>	United States Hang Gliding & Paragliding Association (USHPA) Intermediate Paragliding Rating (P-3)	
<b>Flying experience:</b>	Approximately 170 hours	

## Synopsis

At approximately 1500 hours on 28 April 2020, a paraglider pilot (the Pilot) took off from the Ma On Shan paragliding activity area, which was located inside a paragliding activity area designated by the CAD. The Pilot planned to land at Sha Kok Mei<sup>1</sup>, which was located outside the boundaries of the Ma On Shan paragliding activity area.

At around 1512 hours, the Hong Kong Police Force (HKPF) received a report that the Pilot was injured after a collision with a moving lorry near the junction of Tai Mong Tsai Road and Mei Yu Street. The Pilot was conveyed to Tseung Kwan O Hospital for medical treatment.

The investigation found that the Pilot probably lost effective control of the paraglider due to thermals and the conditions of local wind and gust when he manoeuvred for a second approach to land in the planned area. He tried to avoid hitting a building and headed towards the junction of Tai Mong Tsai Road and Mei Yu Street for an emergency landing. He eventually collided with the moving lorry and suffered minor injuries.

One safety recommendation was made.

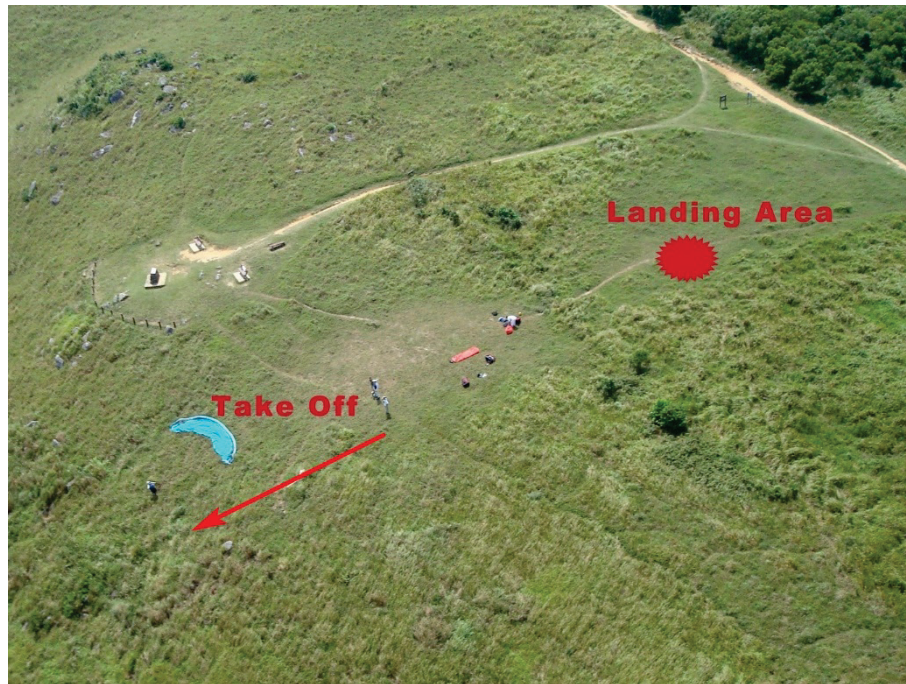
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<sup>1</sup> Sha Kok Mei is a village in Sai Kung Peninsula, Hong Kong.

# 1. Factual Information

## 1.1. History of the Flight

- (1) The Pilot made his first flight from the CAD designated paragliding activity area at Ma On Shan in the early afternoon of the incident day and top-landed near the takeoff area. The first flight was uneventful.

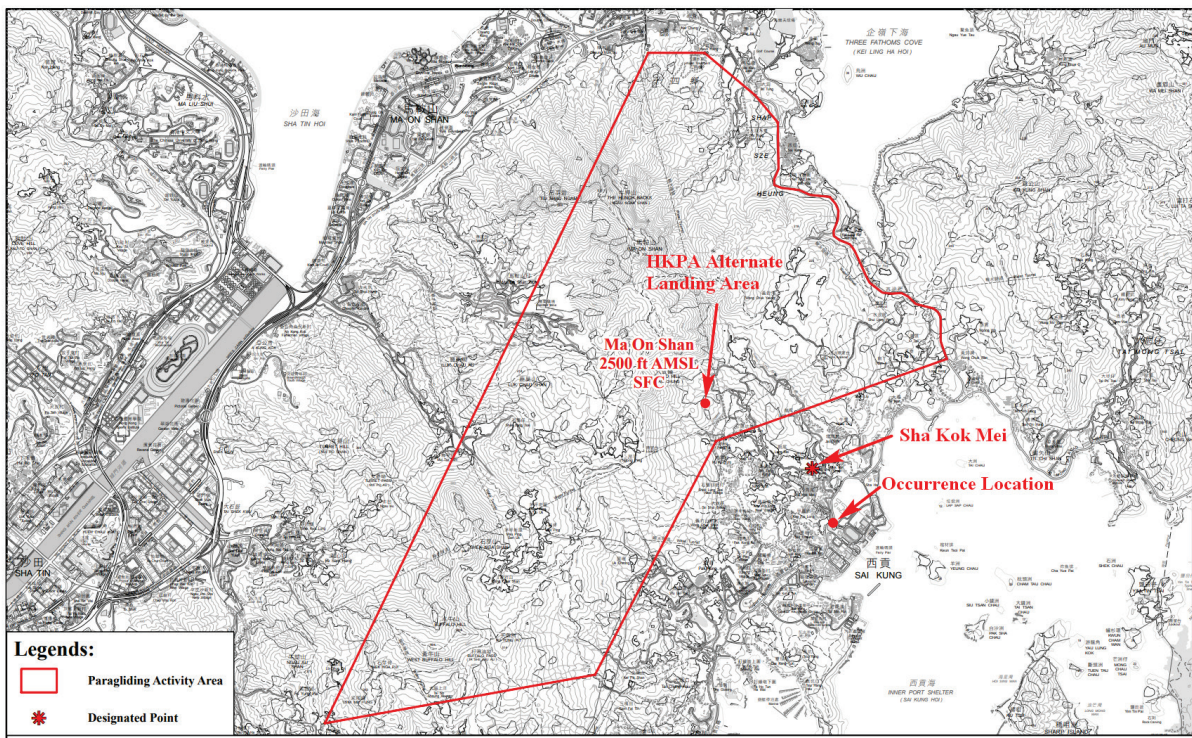


**Figure 1: Ma On Shan Takeoff and Top Landing Area (for Illustration Purpose)**

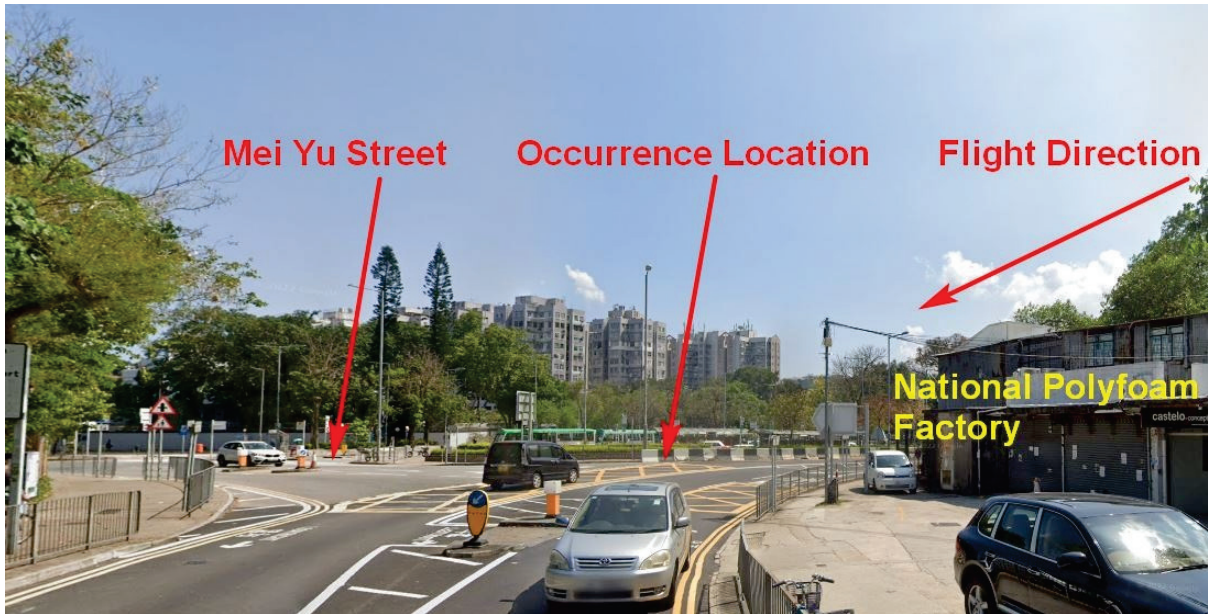
- (2) The second takeoff was around 1500 hours. He noticed that the speed bar was imbalanced during takeoff and found that the left-hand (LH) line of the speed bar was disconnected (see Figure 6 for reference). He had to fly away from the takeoff area with sufficient height for corrective action, while heading to his planned landing area at Sha Kok Mei (SKM). He flew the paraglider towards the south-east side of Pyramid Hill, trying to reconnect the LH line of the speed bar. It took him several minutes to reconnect the LH line in the air. The paraglider was operating normally afterwards.
- (3) It was windy and the Pilot continued to fly to the planned landing area at SKM. He experienced small continuous thermals (rising air) during the flight.
- (4) He was flying higher than the normal approach altitude from the north to the planned landing area. He was more than 200 metres above ground when flying over the feature pine trees at the north-west boundaries of the landing field. He therefore executed a quick descent.



- (5) However, he was still too high and flew past the planned landing area. He decided to lose some altitude over SKM village and carry out a right-hand (RH) circuit to land from the north-west side of the landing area.
- (6) When he was trying to lose altitude over SKM village, he experienced thermals for a short moment. The conditions of local wind and gust induced difficulties for him to control the paraglider and he struggled to carry on the RH circuit to land at the intended area. He then looked for alternate landing area whilst flying over buildings in the village. Meanwhile, the pilot encountered more thermals with vertical movements of about 1 metre per second (m/s) up and down over the SKM village area.
- (7) He could not identify suitable landing area in the vicinity of the SKM village area whilst he kept gliding down in the south-east direction. He was getting closer to the ground and flying over the roof of the National Polyfoam Factory (see Figure 3). He tried to avoid hitting the roof of the factory and therefore headed towards the junction of Tai Mong Tsai Road and Mei Yu Street.



**Figure 2: Sha Kok Mei, Occurrence Location, and CAD Designated Paragliding Activity Area in Ma On Shan**



**Figure 3: Junction at Mei Yu Street**

- (8) He eventually collided with the right front part of a lorry moving southbound at the junction of Tai Mong Tsai Road and Mei Yu Street, which is about 626 metres south-east of the planned landing area at SKM (Figure 4). The lorry driver was able to stop the lorry immediately after the impact by the paraglider.



**Figure 4: Paraglider Collided with the Lorry**

- (9) The Pilot managed to stand up and disengaged the canopy from the harness after the impact. With the assistance of a passer-by, he walked to the pavement.



- (10) The lorry driver assisted to collect the canopy and the passer-by called the HKPF for assistance.
- (11) The HKPF and an ambulance arrived at the scene and the Pilot was conveyed to Tseung Kwan O Hospital for medical treatment.
- (12) No radio transmission or phone call was made by the Pilot during the flight and after the incident.
- (13) Prior to takeoff, the Pilot only planned to land in SKM and had not considered any alternate landing area should he encounter an emergency situation.

## **1.2. Injuries to Persons**

- (1) The Pilot suffered from "Left Thigh Deep Laceration" and a minor rib crack. He was discharged from the hospital on 29 April 2020.
- (2) No other person was injured in this incident.

## **1.3. Damage - Paraglider**

One canopy leading edge cell opening was damaged.



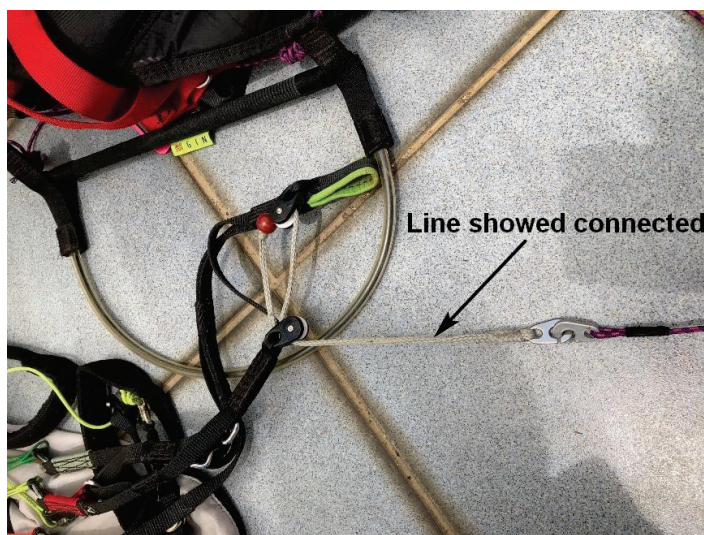
**Figure 5: Damaged Canopy Leading Edge Cell Opening**

## **1.4. Personnel Information**

- (1) The Pilot learnt paragliding in Hong Kong in January 2015. He held a licence issued by the United States Hang Gliding & Paragliding Association (USHPA) and was a P3 qualified paraglider. He attended a Simulated Incident in Flight (SIV) training in 2017.



- (2) The Pilot had conducted about 420 flights, accruing more than 170 flying hours from 2015 to 2020.
- (3) The Pilot was not a member of the HKPA. He had not read the information and was not aware of the safety information and alerts published in the HKPA website.
- (4) The Pilot advised the investigation team that he had flown in the Ma On Shan paragliding activity area and landed at the SKM landing area about 100 times in the past, but he was unaware that SKM was outside the boundaries of the CAD designated paragliding activity area.
- (5) He had conducted a pre-flight check of his paraglider and harness package prior to the second flight, but he was unable to discover the disconnection of LH line of the speed bar.



**Figure 6: Line Connection of the Speed Bar (for Reference)**

- (6) The total weight of the Pilot and paraglider was approximately 80 kg, which was within the defined weight range of the manufacturer's specification.

## **1.5. Paraglider Information**

- (1) The Pilot operated a Geronimo<sup>2</sup> M-27 Paraglider, which was an EN-B certified paraglider of medium (M) size, fitted with a Woody Valley Wani2 harness of large (L) size. He also carried a reserve parachute, a helmet, a pair of gloves, a walkie talkie (not used), a compass and a variometer<sup>2</sup>.

<sup>2</sup> A variometer is a device which informs paraglider pilots of the rate of descent or climb. A variometer records data such as speed, altitude, and climb rate, and can send this data over Bluetooth or USB to a smartphone, a tablet, or an e-reader.

- (2) The variometer was damaged during the impact and it was not collected after the incident. Therefore, no flight data was available for download and analysis. However, a video of how the paraglider hit the lorry was captured by a car camera and posted on the internet.
- (3) The investigation found that the last inspection of the paraglider/canopy, the harness and the reserve parachute was conducted in December 2019.

## 1.6. Meteorological Factors

- (1) According to the Pilot, the weather was good with clear sky on the incident day. The website of Hong Kong Observatory (HKO) showed easterly wind of about 27 kilometres per hour (km/h) around 1500 hours at Tate's Cairn. He considered the wind condition acceptable for flying.
- (2) The investigation team obtained the following wind direction and speed information from the Hong Kong Observatory. The mean wind speeds from 1500 to 1515 hours as shown in Table 1 were higher than the ranges recommended by the HKPA [see 1.7.3 (1) (vii)].

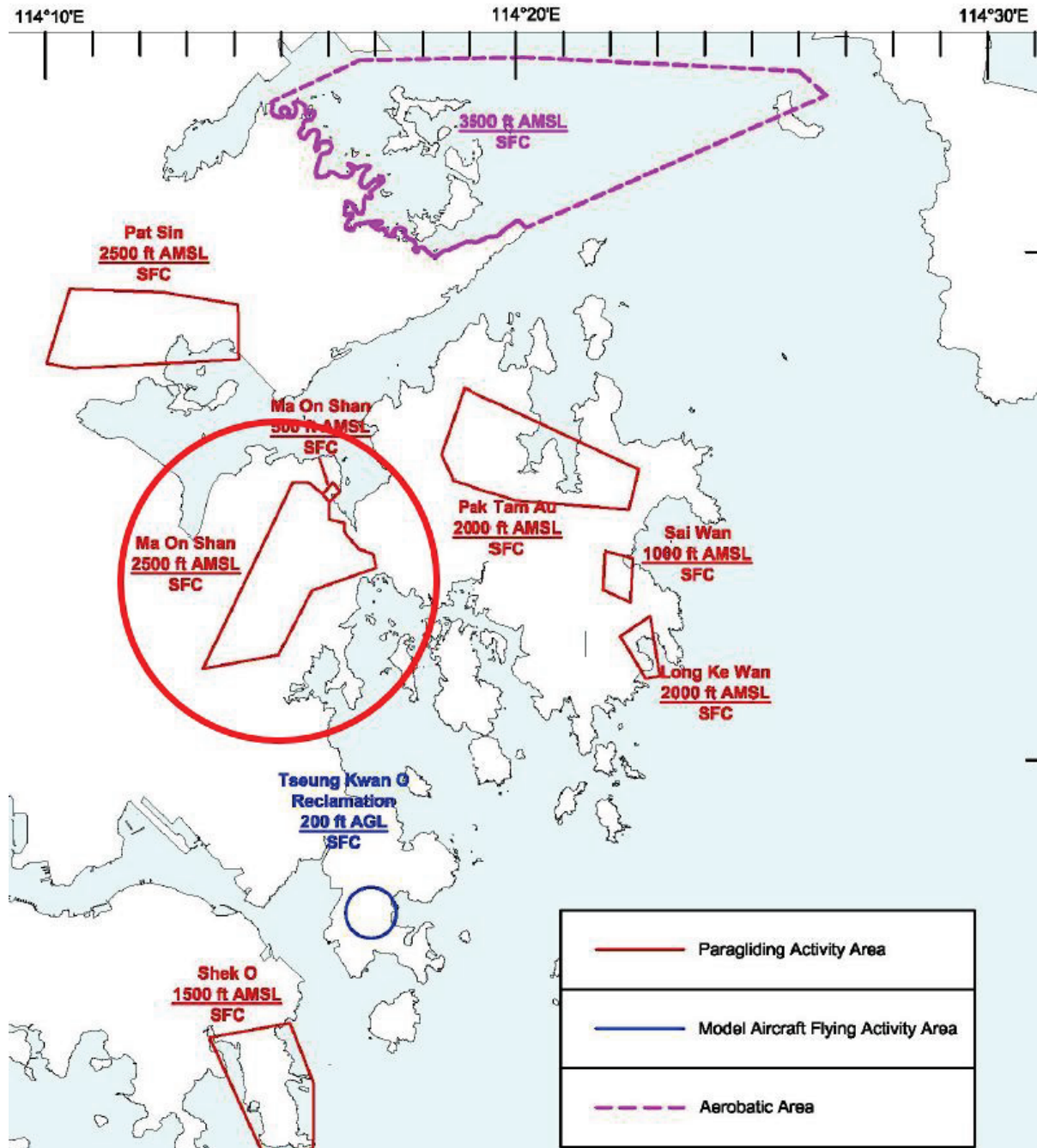
HKT	Tate's Cairn			Sai Kung		
	10-min			10-min		
	mean direction (degree)	mean speed (km/hr)	max. gust (km/hr)	mean direction (degree)	mean speed (km/hr)	max. gust (km/hr)
1500	104	27	34	149	19	32
1501	103	27	34	149	19	32
1502	103	27	39	149	19	32
1503	102	28	39	148	19	32
1504	102	28	39	148	19	28
1505	102	28	39	149	19	25
1506	102	28	39	147	19	25
1507	103	28	39	144	18	25
1508	102	28	39	144	18	25
1509	103	27	39	145	18	25
1510	102	28	39	144	18	25
1511	102	28	39	145	19	25
1512	103	28	37	144	19	27
1513	103	28	37	143	19	27
1514	103	28	37	144	18	27
1515	104	28	37	144	18	27

**Table 1: 10-Minute Mean Wind Direction, 10-Minute Mean Wind Speed and 10-Minute Maximum Gust at the Automatic Weather Stations of Tate's Cairn and Sai Kung from 1500 to 1515 Hours**

## 1.7. Additional Information

### 1.7.1. Designated Aerial Sporting and Recreational Activities Locations

- (1) CAD published the information of designated areas for paragliding activities, including the site boundaries and operating altitudes, in Section ENR 5.5 of the Aeronautical Information Publication Hong Kong (AIP HK).



**Figure 7: Boundaries of the Paragliding Activity Area in Ma On Shan Stipulated in the AIP HK**

- (2) SKM was located outside the boundaries of the Ma On Shan paragliding activity area (see Figure 2).

### **1.7.2. CAD General Guidance on Pre-flight Check and Paragliding Activity Area**

- (1) A general guidance to perform pre-flight check on paraglider and associated equipment is published in CAD's "Safety Guidance on Paragliding Activities" in its website as follows: -

*Perform a pre-flight check on the equipment before inflating the wing to include but not limited to: -*

- (i) Helmet is fastened*
- (ii) Harness leg straps are fastened*
- (iii) Wing is connected in the correct orientation*
- (iv) Speed system is attached*
- (v) Brake lines are not twisted*
- (vi) Reserve parachute pins are secured (if applicable)*

- (2) In the CAD's "Safety Guidance on Paragliding Activities", paraglider pilots are also repeatedly reminded to keep their paragliding activities within the designated areas to ensure safety. They shall also avoid landing on any private premises without permission from the landowners or site-owners.

### **1.7.3. HKPA Information and Warning for Ma On Shan Paragliding Activity Area**

- (1) The HKPA posts the following information and warning about the Ma On Shan paragliding activity area in the website for its members and the paragliding community: -

- (i) Licence rating : HKPA 3 holders or above*
- (ii) Flyable wind direction : East or South East*
- (iii) Altitude limit : 2500 ft*
- (iv) Landing Area : Top Landings only*



- (v) *Landings prohibited at Sha Kok Mei*
- (vi) *Sha Kok Mei is outside the boundaries of the Ma On Shan paragliding activity area. Do not launch with the intention of landing outside the paragliding areas.*
- (vii) *Winds to look for on the HKO website are Tate's Cairn 15-25 km/h ENE to SE (Force 3-4) and Sai Kung E to SE 10 km/h (Force 2-3).*
- (viii) *If the wind is 30+ km/h, the lift generated on the ridge can make it difficult to top land.*

- (2) The HKPA identifies an alternate landing area of Ma On Shan paragliding activity area and posts this location in its website, which is within the boundaries as defined by the AIP HK (see Figure 2).

## 2. Safety Analysis

- (1) The Pilot had operated 420 flights, accruing more than 170 flying hours. He would be experienced to operate the EN-B paraglider.
- (2) According to the site guides of the HKPA, the required pilot rating for solo is HKPA 3 holders or above. The Pilot held a USHPA P3 licence and had attended an SIV course, this was considered equivalent to the HKPA 3 pilot rating.
- (3) The HKPA's guidance on flying at Ma On Shan advised that the site should be for top landing only. The Pilot should not have planned to land at SKM although this landing location was commonly used by some paraglider pilots. There was also no predetermined alternate landing area in its vicinity. The Pilot had been flying at the Ma On Shan paragliding activity area and landed at SKM about 100 times in the past, but he only noticed after this incident that the landing area at SKM was located outside the Ma On Shan paragliding activity area as stipulated in the AIP HK (see Figure 2).
- (4) The Pilot took off at around 1500 hours. The 10-minute mean wind speed at Tate's Cairn was easterly at about 30 km/h, while the 10-minute maximum gust increased from 34 km/h at 1500 hours to 39 km/h at 1502 hours and lasted until 1511 hours as shown in Table 1. The wind and gust during the Pilot's flying time was higher than the recommended wind speed published in the HKPA website as stated in 1.7.3.(1)(vii). The paraglider pilot should not have taken off from the site in such wind conditions.
- (5) The Pilot had conducted a pre-flight check of his paraglider and harness package prior to the second flight, but he was unable to discover the

disconnection of the LH line of the speed bar. Paraglider pilots should strictly follow the general guidance on pre-flight check on equipment published by the CAD to ensure flight safety.

- (6) It took the Pilot several minutes to reconnect the LH line in the air. The paraglider was operating normally afterwards. It is considered that this disconnection problem did not significantly affect his control of the paraglider.
- (7) After the reconnection of the LH line, the Pilot found that he was flying higher than the normal approach altitude to the landing area at SKM. He flew past SKM and his second approach to land by carrying out a RH circuit might have been affected by thermals and the conditions of local wind and gust. It probably resulted in an ineffective control of the paraglider and an uncoordinated turn in the landing approach. Since no suitable alternate landing area was available, he eventually collided with a moving lorry during the emergency landing.
- (8) Landing at an area outside the boundaries of the paragliding activity area as defined by the AIP HK may compromise the safety of either the paraglider pilots or members of the public due to the existence of power lines, buildings, or other aircraft movement in the vicinity of the landing area.
- (9) One canopy leading edge cell opening was damaged, probably during its impact with the lorry or when the canopy was pulled to separate from the lorry after the crash.
- (10) The current HKPA website provides useful safety information on the CAD designated areas for paragliding activities, namely altitude limit, flyable wind direction, recommended wind speed, required pilot rating, general atmospheric condition, location of takeoff, landing and alternate landing area, prohibited landing area, threat to flying, etc.
- (11) The CAD website posts “Safety Guidance on Paragliding Activities” that was updated on 27 April 2022 to include that paraglider pilots could make reference on the site guides published by local paragliding association, especially on recommended pilot qualifications and weather conditions before the conduct of paragliding activity. It also states that “Be familiar with the site particulars, including the boundaries of paragliding activity area as published on the AIP HK, the suitable takeoff/landing areas of the site and potential hazards.”
- (12) The investigation team considers that the CAD could enhance the guidance promulgated to paragliding community to encourage paraglider pilots to proactively plan the landing approach prior to takeoff, including the selection of a landing area and an alternate landing area located within the boundaries of the CAD designated paragliding activity area.

### 3. Conclusions

#### 3.1. Findings

- (1) The Pilot has sufficient experience and qualification to fly the EN-B paraglider. The paraglider is appropriate for the Pilot's weight. [1.4. (2), 1.4. (6), 2. (1), 2. (2)]
- (2) The HKPA website identified an alternate landing area inside the Ma On Shan paragliding activity area, but the Pilot's planned landing area was outside its boundaries. [1.1. (13), 1.7.3. (2)]
- (3) The Pilot was not a member of the HKPA and unaware of the safety information and alerts published on the HKPA website. [1.4. (3)]
- (4) The Pilot was unaware that the landing area at SKM was outside the boundaries of the Ma On Shan paragliding activity area as stipulated in the AIP HK and was unaware of similar site boundaries information published on the HKPA website. [1.4. (4), 1.7.1., 1.7.3. (1), 2. (3)]
- (5) The HKPA website alerted that the Ma On Shan paragliding activity area should be for "Top Landings Only". SKM is located outside the Ma On Shan paragliding activity area as stipulated in the AIP HK. [1.7.3. (1), 2. (3)]
- (6) The wind and gust during the Pilot's flying time was higher than the recommended wind speed published on the HKPA website. [1.6. (2), 2. (4)]
- (7) The Pilot did not discover the disconnection of the LH line of the speed bar during the pre-flight check prior to the second flight. [2. (5)]
- (8) The Pilot flew past the intended landing area and probably lost effective control of the paraglider due to thermals and conditions of local wind and gust in his second approach to the planned landing area. He was injured during the collision with a moving lorry in the emergency landing. [2. (7)]
- (9) Landing at an area outside the boundaries of the paragliding activity area as defined by the AIP HK may compromise the safety of either the paraglider pilots or members of the public due to the existence of power lines, buildings, or other aircraft movement in the vicinity of the landing area. [2. (8)]
- (10) The CAD's "Safety Guidance on Paragliding Activities" could be enhanced to encourage paraglider pilots to proactively plan the landing approach

prior to takeoff, including the selection of landing area and alternate landing area. [2. (12)]

## **3.2. Causes**

The Pilot probably lost effective control of the paraglider due to thermals and conditions of local wind and gust in his second approach to the planned landing area. He was injured during the collision with a moving lorry in the emergency landing. [3.1. (8)]

## **3.3. Contributing Factors**

- (1) The wind and gust during the Pilot's flying time was higher than the recommended wind speed published on the HKPA website. [3.1. (6)]
- (2) The Pilot chose a landing area at Sha Kok Mei which was outside the CAD designated paragliding activity area. [3.1. (5)]

# **4. Safety Actions**

## **4.1. Safety Actions Taken by the CAD**

- (1) The AAIA was advised by CAD of the following safety actions that had been taken: -
  - (a) In view of the increasing popularity of paragliding activities in Hong Kong, CAD has all along been communicating and collaborating closely with the two paragliding organisations<sup>3</sup> on operating paragliding activities safely, reviewing paragliding activity areas, promulgating safety guidance, investigating paragliding incidents, implementing safety recommendations, following up on complaints as well as promoting safety awareness.
  - (b) To notify other local airspace users of the possible paragliding activities and to ensure aviation safety within the limited airspace of the Uncontrolled Airspace Reporting Area (UCARA) and Lantau Control Zone, CAD has published in the AIP HK details of the designated paragliding areas since 1990s, including individual site boundaries and operating altitudes. Similar information is also published on the CAD's and the HKPA websites for reference by the paragliding community.

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<sup>3</sup> Hong Kong Paragliding Association and Hong Kong Paragliding Federation



- (c) Upon consultation with stakeholders (including the two paragliding organisations), CAD has published the “Safety Guidance on Paragliding Activities” on the website in October 2018 to draw the attention of paraglider pilots to the applicable laws and the importance of ensuring safety. CAD has regularly reviewed and updated the “Safety Guidance on Paragliding Activities” to incorporate up-to-date safety information, including safety recommendations made by the AAIA. The paragliding organisation(s) had also been requested to promulgate the updated safety guidance to their members and the paragliding community at large so as to further enhance their safety awareness.
- (d) With a view to enhancing paraglider pilots’ understanding on aviation regulations, flight rules and local operating environment, CAD has established and conducted the Air Law Examination (Paragliding) since 2019. While it is a mandatory requirement for the permit applicants to pass the examination, CAD also recommends all other paraglider pilots (through the paragliding organisations) to sit for the examination to strengthen their knowledge on aviation regulations, flight rules and local operating environment.
- (e) CAD has also requested the paragliding organisations to conduct a comprehensive review on the existing paragliding areas, including but not limited to the identification of recommended take-off / landing / emergency landing sites and the skill levels required to conduct paragliding activities within each of the areas, and publish the information on their websites for reference by the paraglider pilots.
- (f) CAD would continue to coordinate with the stakeholders, inter alia, relevant government departments in erecting signs at various paragliding take-off sites, so as to provide the paragliding community with safety information on site.
- (g) In addition to providing comments and recommendations on their Operations Manual, Safety Management System (SMS) Manual and incident / accident investigation, CAD would continue to proactively engage the paragliding organisations with a view to establishing closer liaison and collaboration with them on safety promotion.

## **4.2. Safety Actions Taken by the HKPA**

- (1) The AAIA was advised by the HKPA of the following safety actions that had been taken: -
  - (a) The HKPA published Safety Management System Manual to provide guidance on the safety risk assessment.

- (b) The HKPA revised the site guide to provide more safety information, such as minimum pilot rating requirement and weather minima.
- (c) The HKPA had reminded the paragliding community to keep their flying activities within the areas published in AIP HK to ensure safety.
- (d) The HKPA had searched for an alternate landing area for emergency procedures and published on the site guide.
- (e) The HKPA revamped their website by adding bilingual text to improve readability of safety information; added information on recommended suitable wind conditions for the different paragliding activity areas; check in/out for flying sites; and added a webcam for the Lantau flying area.
- (f) The HKPA actively promoted the CAD's permit regime on the offering of air services using paraglider for hire or reward to enhance the legitimacy of entity with competency to conduct instructional or tandem operations in a safe manner.
- (g) The HKPA worked with the Hong Kong Observatory to improve readability of weather information for aviation sports, two additional webcams were installed in Sai Kung region (Sai Kung Marine East Station (looking towards the northwest) and Kau Sai Chau (looking towards the west-northwest)).

## 5. Safety Recommendations

### 5.1. Safety Recommendation 11-2022

It is recommended that CAD to coordinate with the paragliding organisations: -

to enhance the guidance promulgated to the paragliding community to encourage paraglider pilots to proactively plan the landing approach including the selection of landing area and alternate landing area.

**Safety Recommendation Owner:** Civil Aviation Department, Hong Kong; Hong Kong Paragliding Association; Hong Kong Paragliding Federation