

AA2023-2

AIRCRAFT ACCIDENT INVESTIGATION REPORT

**Sapporo Aviation Association
J A 1 0 0 K**

March 30, 2023



The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board and with Annex 13 to the Convention on International Civil Aviation is to determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

TAKEDA Nobuo
Chairperson
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

《Reference》

The terms used to describe the results of the analysis in "3. ANALYSIS" of this report are as follows.

- i) In case of being able to determine, the term "certain" or "certainly" is used.
- ii) In case of being unable to determine but being almost certain, the term "highly probable" or "most likely" is used.
- iii) In case of higher possibility, the term "probable" or "more likely" is used.
- iv) In a case that there is a possibility, the term "likely" or "possible" is used.

AIRCRAFT ACCIDENT INVESTIGATION REPORT

HARD LANDING UPON LAUNCHING

SAPPORO AVIATION ASSOCIATION

ALEXANDER SCHLEICHER ASK13 (GLIDER, TWO-SEATER), JA100K

AT SHINSHINOTSU GLIDING FIELD,

SHINSHINOTSU-MURA, ISHIKARI-GUN, HOKKAIDO, JAPAN

AT ABOUT 12:09, NOVEMBER 3, 2021

February 10, 2023

Adopted by the Japan Transport Safety Board

Chairperson TAKEDA Nobuo
Member SHIMAMURA Atsushi
Member MARUI Yuichi
Member SODA Hisako
Member NAKANISHI Miwa
Member TSUDA Hiroka

1. PROCESS AND PROGRESS OF THE AIRCRAFT ACCIDENT INVESTIGATION

1.1 Summary of the Accident	<p>On Wednesday, November 3, 2021, an Alexander Schleicher ASK13, registered JA100K, operated by the Sapporo Aviation Association, was launched by a winch from Shinshinotsu Gliding Field for a flight training, but the towline was disengaged at a low altitude, resulting in a hard landing. The glider sustained damage and two persons on board suffered serious injuries.</p>
1.2 Outline of the Accident Investigation	<p>On November 3, 2021, upon receipt of the accident notification, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and one other investigator to investigate this accident.</p> <p>Although this accident was notified to the Federal Republic of Germany, as the state of design and manufacture of the aircraft involved in this accident, the State did not designate an accredited representative.</p> <p>Comments on the draft final report were invited from the parties relevant to the cause of the accident and the Relevant State.</p>

2. FACTUAL INFORMATION

2.1 History of the	According to the flight instructor (hereinafter referred to as “the
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Flight

captain”), the student pilot (hereinafter referred to “the trainee”), the launch director and the winch launching operator (winch operator) who were corresponding to communications at the piste (command post), the history of the flight is summarized as follows:

An Alexander Schleicher ASK13, registered JA100K (the glider), that belongs to the Sapporo Aviation Association started pre-flight preparations for the sixth flight of the day at the launch point of Shinshinotsu Gliding Field at about 11:55 JST (Japan Standard Time: UTC+9 hours), on November 3, 2021. The trainee was in the front seat, and the Captain was in the rear seat. It was the second flight for the trainee and the first for the captain on this day. When the trainee signaled the winch operator to take up the slack in the towline (removing the slack from the towline to the state just before towing the glider) with HF radio on board the glider, there was a response from the winch operator that the noise was so bad that it was difficult to listen to the communication. Even after that, as the winch

operator continued to be unable to listen to the messages from the glider, the launch was temporarily suspended. When the winch operator inspected and adjusted the HF radio equipment, it became possible to listen to the transmission, but the situation of the difficulty in listening did not change much. Therefore, it was decided that the launch director at the piste, from which it was possible to communicate with the winch operator without any problem, would relay the radio communication, and then the launch restarted. At about 12:08, the trainee signaled the winch operator to take up the slack in the towline, and the winch operator was able to listen to it and read it back this time. When the trainee sent the winch operator the messages stating “Launch, launch”, the glider started taxiing. And the launch director sent the messages twice stating “Launch, launch,” “Launch, launch” to the winch operator, following the transmission from the trainee.

The launch director felt that the taxiing distance was longer and acceleration is slower than usual, and transmitted the message of “Launch, launch” once again as considering the possibility that the radio message might not be listened to. At this time, the glider had already taken off, but

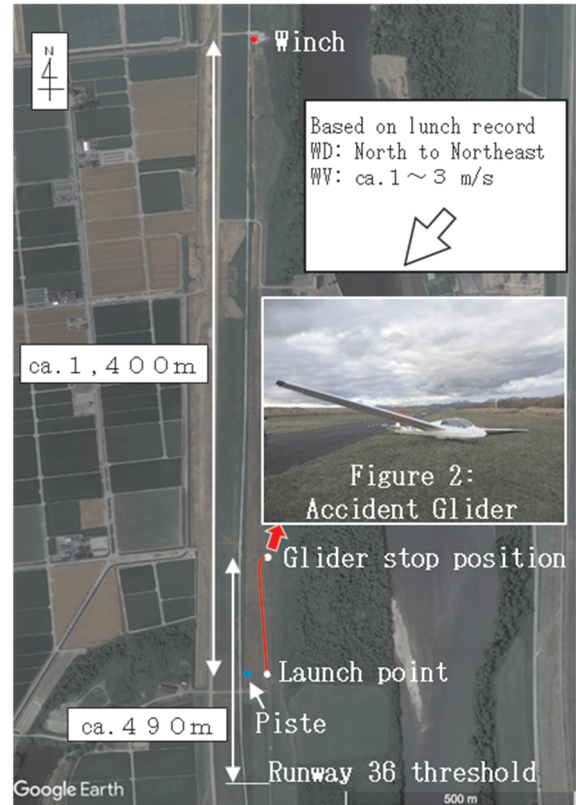


Figure 1: Shinshinotsu Gliding Field

	<p>the winch operator, who listened to this message, thought that the towline might have been cut because the glider did not appear to be moving in spite of the winch operator's winding the towline with a winch, in addition, the message for launch was repeated several times, thus suspended the winch launching operation. The winch operator did not inform the launch director and the glider by the radio that the winch operator suspended the winch launching operation. During that time, the glider was maintaining its climb attitude, the captain and the trainee on board the glider heard a "clack" sound. At this time, the captain and the trainee had not touched the knob for releasing the towline yet. The launch director saw the towline being disengaged and falling. Judging that the towline was disengaged, the captain took over the control from the trainee and was going to land while lowering the nose and acceleration. However, the glider reduced its altitude as if to slide down from the right wing, made a hard landing in the grass area beside the runway, repeated bouncing two times, and came to a stop at approximately 490 m from the Runway 36 threshold while turning to the right. The trainee and the captain on board the glider suffered injuries by the impact of the touchdown.</p> <p>This accident occurred at approximately 490 m from the Runway 36 threshold at Shinshinotsu Gliding Field (latitude 43° 16' 32" North, and longitude 141° 39' 09" East), at about 12:09 on November 3, 2021.</p>
2.2 Injuries to Persons	<p>Captain: Seriously injured Trainee: Seriously injured</p>
2.3 Damage to the Aircraft	<p>Extent of Damage: Slightly damage Main wing rib : Fractured Lower right dive brake : Deformed Right aileron hinge : Deformed</p>
2.4 Personnel Information	<p>(1) Captain Age: 65 Private pilot certificate (High class glider) September 12, 1979 Pilot Competency Assessment Expiry of practicable period for flight: December 1, 2022 Flight instructor certificate (Glider) October 1, 1982 Class 2 aviation medical certificate Validity: April 21, 2022 Total flight time (Number of launch) 909 hours 04 minutes (4,291 launches) Flight time in the last 30 days (Number of launch) 6 hours 42 minutes (42 launches) Flight time for flight instruction (Number of launch) 543 hours 38 minutes (3,400 launches) Time as flight instructor in the last one year (Number of launch) 36 hours 41 minutes (147 launches) Flight time in the last 30 days (Number of launch) 6 hours 09 minutes (39 launches) Total flight time on the type of aircraft (Number of launch)</p>

	<p style="text-align: right;">129 hours 42 minutes (Unknown)</p> <p style="text-align: center;">Flight time in the last 30 days (Number of launch)</p> <p style="text-align: right;">6 hours 42 minutes (42 launches)</p> <p>(2) Trainee Age: 64</p> <p>Student pilot permission Validity: May 27, 2022</p> <p>Total flight time (Number of launch)</p> <p style="text-align: center;">18 hours 00 minutes (Solo flight 0 launches out of 88 launches)</p> <p style="text-align: center;">Flight time in the last 30 days (Number of launch)</p> <p style="text-align: center;">3 hours 27 minutes (Solo flight 0 launches out of 19 launches)</p> <p style="text-align: center;">Flight time on the type of the aircraft (Number of launch)</p> <p style="text-align: center;">18 hours 00 minutes (Solo flight 0 launches out of 88 launches)</p>																
2.5 Aircraft Information	<p>Aircraft type: Alexander Schleicher ASK13</p> <p>Serial number: 13281 Date of manufacture: November 19, 1970</p> <p>Certificate of airworthiness: 2021-38-01 Validity: May 23, 2022</p> <p>Total flight time: 4,105 hours 50 minutes</p> <p>When the accident occurred, the weight of the glider was 466 kg and the weight and the center of gravity were each within the allowable range.</p>																
2.6 Meteorological Information	<p>According to the launch record on the day of the accident, it was cloudy with a winds from north to northeast at 2 to 6 kt (about 1 to 3 m/s).</p> <p>According to values observed at 12:10 on the day of the accident in Shinshinotsu Regional Meteorological Observatory (AMeDAS), located about 6.2 km north of the gliding field, the average wind velocity was a northeasterly wind of 3.1 m/s and the maximum instantaneous wind velocity was a northeasterly wind of 5.1 m/s.</p>																
2.7 Additional Information	<p>(1) Video image</p> <p>The video image taken by the trainee with a head-mounted camera recorded the events from pre-flight preparations up until the occurrence of the accident, and generally showed the followings: (See Table 1 and Figure 3)</p> <p style="text-align: center;">Table 1: History of flight confirmed from video image</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Time</th> <th>Situation</th> </tr> </thead> <tbody> <tr> <td>12:08:30</td> <td>The trainee sent “Sapporo Winch, JA100K Two-seater, ready, take up slack.” to the winch operator by radio.</td> </tr> <tr> <td>12:08:38</td> <td>The winch operator read back, “Sapporo Winch, Roger, JA100K Two-seater, ready, take up slack.”.</td> </tr> <tr> <td>12:09:00</td> <td>The towline started to be pulled.</td> </tr> <tr> <td>12:09:01</td> <td>The glider advances a little, and the trainee sent the message by radio, stating, “Launch, launch”. The towline was pulled, and the glider began to be towed.</td> </tr> <tr> <td>12:09:04</td> <td>The launch director sent “Launch, launch,” Launch, launch” by radio.</td> </tr> <tr> <td>12:09:14</td> <td>Took off</td> </tr> <tr> <td>12:09:15</td> <td>The launch director sent the third “Launch, launch” by radio.</td> </tr> </tbody> </table>	Time	Situation	12:08:30	The trainee sent “Sapporo Winch, JA100K Two-seater, ready, take up slack.” to the winch operator by radio.	12:08:38	The winch operator read back, “Sapporo Winch, Roger, JA100K Two-seater, ready, take up slack.”.	12:09:00	The towline started to be pulled.	12:09:01	The glider advances a little, and the trainee sent the message by radio, stating, “Launch, launch”. The towline was pulled, and the glider began to be towed.	12:09:04	The launch director sent “Launch, launch,” Launch, launch” by radio.	12:09:14	Took off	12:09:15	The launch director sent the third “Launch, launch” by radio.
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12:09:16	The altimeter indicated about 38 ft, the speed indicator was at about 75 km/h. (The altimeter was set at 30 ft, an elevation of the Gliding Field, before the take-off, thus, the altitude above the ground level (AGL) would be at about 8 ft (about 2.4 m). (See Figure 4)
12:09:18	After a "clack" sound, the captain stated "It got disconnected, disconnected."
12:09:19	The nose went down.
12:09:20	The altimeter indicated about 90 ft (the AGL was at about 60 ft (about 18 m)), and the speed indicator was at about 50 km/h. (See Figure 5)
12:09:23	There was an impact sound along with the touchdown.
12:09:24	There was an impact sound along with the touchdown.
12:09:25	There was an impact sound along with the touchdown.
12:09:26	The glider was taxiing while turning to the right.
12:09:28	The glider came to a stop.

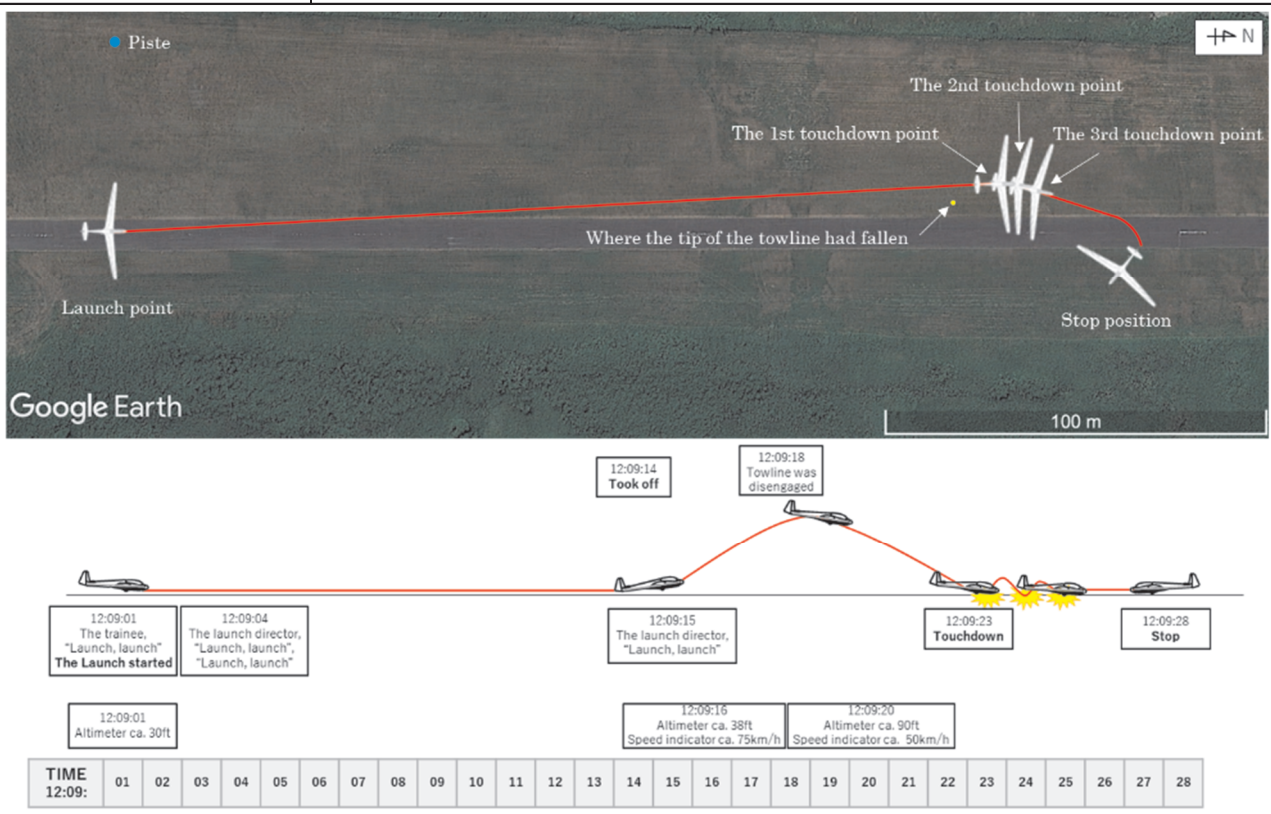


Figure 3: Estimated flight route



Figure 4: Indication at 12:09:16



Figure 5: Indication at 12:09:20

(2) Conditions of the winch

The winch was operating normally even after the accident.

(3) Winch operator

The winch operator had prior experience in winch launching more than 350 times in seven years, but had not come to the Gliding Field for about six months prior to the accident. As the winch operator was supposed to operate winches on the day of the accident after a long time, the winch operator came to view the winch operation by a member of the Association who was familiar with the operation for the first flight, and for the second flight, the winch operator was operating the winch while receiving instructions from the member, and confirmed the winch operator would be able to operate winched without any problems. After the third time, the winch operator was engaged in winch operation by oneself. The winch operator was operating with the mind for accelerating slowly.

(4) Flight manual and the Association's winch operation procedures

① Flight manual

The flight manual of the glider includes the following descriptions on the winch launching speed and stall speed. (Excerpts):

Section 2 Limitations

2-1. Airspeed limitation

(Omitted)

Winch launching speed: V_w 100 km/h

(Omitted)

Chapter 4 Normal Operation

4-5. Normal launching method

4-5-1. Winch launching and vehicle towing

The maximum winch launching speed shall be 100 km/h. It shall be necessary to pay attention to the fact that during winch launching, pulling back on the control stick tends to increase airspeed. During take-off, a glider tends to have a nose-up attitude, thus the control stick shall be slightly pushed forward. At the time of best rate of climb, the column shall be at neutral position. At the end of the launch, the control stick shall be lightly pushed. The CG hook shall be used for winch launch.

(Omitted)

Section 5. Performance

5-1-1. Stall speed

At total flight weight of 450 kg 59 km/h

365 kg 53 km/h

② Winch operation procedures of the Association

The winch operation procedures prepared by the Association includes the following descriptions. (Excerpts)

④ · Winch : Refer to the placard on to the seat for the start

(Omitted)

⑥ · The winch launching shall be cautiously performed by listening to the radio call.

When listening to the call to “take up slack”, read it back by radio, start the engine, apply the brakes, put it in 2nd gear, release the brakes, open the throttle slightly, and pull it slowly for a while looking at the drum. Do not create the slack in the towline even when closing the throttle slightly because of excessive acceleration.

The throttle shall be opened “gradually and swiftly” by calling “Launch, launch!”

(Call “Red! Red!” aloud by the radio at the time of emergency stop on the ground, by radio) It is like opening the throttle slowly at first so as not to deliver a shock, and open it to full throttle in two to three seconds with increasing speed once it starts to move.

The winchmen’s cardinal rules and etc. are as described in other many documents, however, after the launch, a winchman shall have to try to apply full power to launch the glider at any cost (there may be exceptions) up to a safe altitude while monitoring its climb angle carefully (When “Up” is taken, its fuselage looks long).

The initial throttle opening shall be full for ASK13 two-seater and 80-90% for single-seater aircraft, however, if there is tailwind component (almost no load on the winch), the throttle shall be fully open and the maximum winding speed is the principle. (rest

	<p style="text-align: center;"><i>omitted)</i></p> <p>In addition, on the winch, stuck was a placard titled as “Winch: Operation procedures” indicated in the Association's winch operation procedures [4], which include the following descriptions other than the winch start procedure. (Excerpts)</p> <p style="text-align: center;"><u>Cable breakage : Release disengaged</u> Brake/Engine shutdown <u>Engine failure after the take-off</u> Report to the pilot and request to disengage</p> <p>③ Emergency operations and status of familiarization with winch operation procedures in the Association</p> <p>In the Association, the members regularly used not “Red! Red!” described in the Association’s winch operation procedures, but “Winch stop.” In addition, the Association’s winch operation procedures had not been made known to all members, and the parties involved in this accident did not also know the existence of the winch operation procedures.</p>
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3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilot	Yes
3.3 Involvement of Aircraft	None
3.4 Additional Involvement	Involvement of the winch operator: Yes
3.5 Analysis of Findings	<p>(1) Flight operations</p> <p>The JTSCB concludes that the glider’s towline was most likely disengaged although the captain and the trainee did not release the towline because the towline became not pulled as the winch operation was stopped, the tow speed became below the speed of the glider, the towline was pulled to aft, resulting in the disengagement due to the mechanism of the glider’s hook. As the glider was maintaining its climb attitude, the glider’s AGL rose to about 60 ft (about 18 m), and the speed declined to about 50 km/h. The captain heard a "clack" sound to notice the disengagement of the towline, and immediately took over the control from the trainee and took a nose down operation. However, it is highly probable that as the speed could not be recovered due to its low altitude, and it became far below the stall speed, the glider was reaching the ground while not stopping sinking and made a hard landing.</p> <p>The captain and the trainee most likely suffered injuries to the lower back from the impact of the hard landing.</p> <p>(2) Radio communication relay</p> <p>The JTSCB concludes that as it was difficult to listen to the radio communication at the time of launching the glider, after the launch was temporarily suspended, it was decided that the launch director would relay</p>

the radio communication, and then the launch restarted, however, it is most likely that there was no need for the launch director to relay the radio communication because the glider was launched communicating by radio with the winch operator. It is probable that the launch director should have placed priority on recovering the state of the radio communication and not have performed the launch in such an easy way as relaying the radio communication. For winch launches, it is more likely necessary that the state of the radio communication shall be checked before the launch, and periodical device inspections shall be performed in order to maintain a good radio communication status.

(3) Winch operation by the winch operator

- ① The timing when the winch operator stopped the winch operation was most likely between the third “Launch, launch” signaled by the launch director who felt the launching speed slow and the time when the towline was disengaged. The reason why the winch operator stopped the winch operation is highly probable that the glider did not appear to be moving and the winch operator judged that the winch operation should be stopped because he misunderstood the launch director’s signal meant the towline was cut. However, except the emergency situation such as the winch’s engine shut down etc., stopping the winch operation during launch is the most dangerous behavior, and it is probable that the winch operator should not stop the properly working winch at least until glider’s reaching a safe altitude as described in the Association's winch operation procedures. It is more likely that even if the winch operator confirmed that the towline had been cut, the winch operator should not have judged for oneself and stopped the winch operation until the signals for stopping the winch operation like “Red” or “Winch stop” were sent or at least until the glider reached a safe altitude.
- ② It is probable that as the winch operator did not follow the winch operation procedures indicated on the placard, and inform the glider swiftly by radio that the winch launching operation was stopped, the captain and the trainee were delayed in noticing that the glider was not launched by a winch, and therefore the glider continued to maintain the climb attitude.
- ③ The winch operation procedures prepared by the Association describe on matters required for safe launches, such as winch launching methods including “applying full power to launch the glider at any cost up to a safe altitude” and signals at emergency condition. Therefore, it would be more likely effective measures to ensure safe activities by making the procedures known to the users of the Gliding Field in order to share the awareness of the winch launching methods and emergency procedures.

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this accident was most likely that while the glider was launched by a winch, the winch operator misunderstood that the towline was cut and stopped the winch operation, but the glider was not able to recognize it and maintained the climb attitude, thus, it became far below the stall speed, the glider made a hard landing, the glider sustained damage, and the persons on board suffered injuries.

5. SAFETY ACTIONS

<p>5.1 Safety Actions Required</p>	<p>As described in “3. ANALYSIS”, for winch launches, it is necessary to share among the involved parties the awareness of matters required for safe launches such as the pre-flight check of radio communication, the winch launching methods and emergency procedures. In addition, it is desirable to develop a system for proper management in order to perform periodical inspections of equipment such as radio and winches and keep their records.</p>
<p>5.2 Safety Actions Taken</p>	<p>The Association took the following safety actions.</p> <p>(1) Revision of the winch operation procedures</p> <p>The Association’s winch operation procedures were revised as the winch launching related manual and checklist and specified the qualification requirements for winch operators. In addition, it was specified that if there is a gap of more than one month in the experience of winch launching, it must be checked by the senior operator, and this manual was made known to the members.</p> <p>(2) Aborting the launch at the time of poor radio sensitivity</p> <p>The radio sensitivity shall be checked while the engines of the winch are running, and when the sensitivity of the radio communication with a glider is found poor, the launch shall be aborted. In addition, it was decided not to relay the radio at the piste when launching.</p> <p>(3) Standardization of the signal for the suspension of winch operations</p> <p>The signal for the suspension of winch operations was unified as “Sapporo AKA (red).”</p> <p>(4) Thorough condition check at the start of the initial climb phase</p> <p>The pilot shall maneuver the aircraft always assuming that the launching might be interrupted due to cable breakage, engine failure, etc., and thoroughly check the condition of the aircraft to ensure safety during the initial climb.</p> <p>(5) Read back of the start signal from the winch side</p> <p>It was decided to read back the towed aircraft's "Launch, launch" signal while operating the winch.</p>