

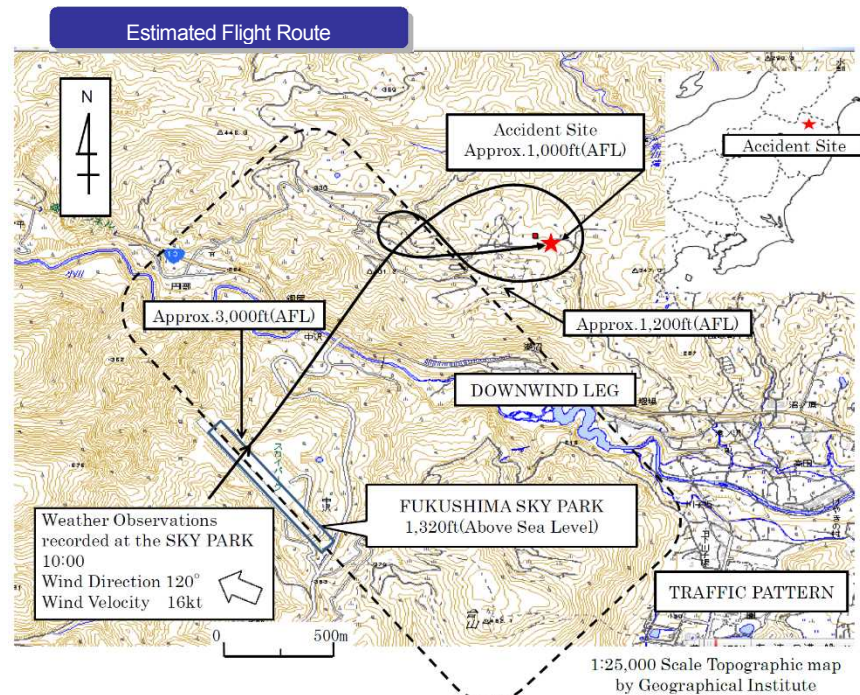
Case 2 Due to fuel exhaustion and insufficient flight planning (Fuel exhaustion)

When returning from a familiarization flight, the Small Aircraft made a forced landing due to fuel exhaustion and was damaged. (Captain: Age 26, Total flight time: 357 hours; Another pilot on board: Age 46, Total flight time: 1,070 hours)

Summary: On Monday May 12, 2014, a privately owned Extra EA300/L, took off from Fukushima Sky Park Temporary Airfield for a familiarization flight. While returning to the Airfield after finishing the familiarization flight, the Aircraft failed to increase the engine power and made a forced landing on a bamboo grass field in Nakanochinai, Iizaka-cho at around 10:16.

The captain got slightly injured and another pilot on board got seriously injured.

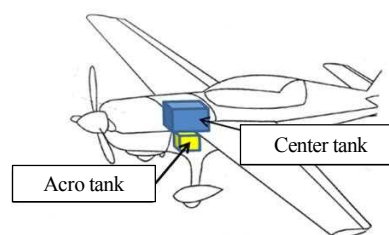
The Aircraft was destroyed but there was no outbreak of fire.



Detailed Damage Description



Fuel Tank



Developments Leading to the Accident

Around 09:42

An aircraft with a center tank and an acro tank having been fully fueled, took off from Fukushima Sky Park Temporary Air Field (hereinafter referred to as "the Sky Park") for familiarization flight with the captain sitting in the rear seat and piloting the aircraft, and the pilot sitting in the front seat.

The pilot performed a series of acrobatic maneuvers called a "sequence." Thereafter, taking over the piloting from the pilot, the captain performed the same sequence. Taking over the piloting from the captain again, the pilot performed the third sequence of the day.

After completing the last sequence, the pilot closed the throttle and headed for the Sky Park while descending.

The captain opened the throttle to increase the engine power for level flight at the downwind leg, but the engine didn't respond.

The captain repeated opening/closing of the throttle several times but the engine power didn't increase. The captain didn't check the fuel quantity indicator at that time.

The captain decided to make a forced landing in a peach orchard, which he found by chance in the mountain area.

Around 10:15

The captain reported to Fukushima Flight Service that they were in a situation of emergency.

Around 10:16

The aircraft flew to the peach orchard while turning left and approached there almost wing level altitude at approximately 3 m above ground level. Having the middle of its left wing collide against an iron pole which stood at the border of a peach orchard and a bamboo grass field, the aircraft made forced landing on a bamboo grass field and came to stop upside down.

Analysis of Causal Factors of the Accident

Remaining fuel

It is highly probable that the aircraft consumed more fuel than that of the captain and the pilot estimated during the three times of sequences.

Since the flight time elapsed more than 30 minutes after takeoff and very little remaining fuel was detected from the acro tank, it is also highly probable that the fuel quantity indicator had read “zero” when the aircraft entered the downwind leg.

The remaining fuel in level flight cannot be used safely when indicator reads “zero”, it is highly probable that the fuel was almost exhausted at that time, thus the aircraft couldn't get the sufficient engine power to return back to the Sky Park.

Endurance and the fuel consumption rate

Endurance under the Pilot's Operating Handbook

The endurance for the full tank (a center tank and an acro tank) is supposed as follows: Approximately 30 minutes with maximum power, approximately 35 minutes with 75% Power, approximately 48 minutes with 65% Power.

Some indeterminate variables such as engine and propeller, air turbulence and others may account for variations as high as 10% or more in range and endurance.

Captains' awareness

The captain estimated the endurance at approximately 33 minutes but he had perceived that there was sufficient time to fly because the maximum power would not always used during the acrobatic flight.

Pilot's awareness

The pilot estimated the endurance at 35 minutes based on his experience.

- It is probable that both of them didn't grasp the fuel consumption rate based on the past fuel consumption results.
- It is highly probable that both of them continued flying without apprehension about fuel exhaustion in spite of that they had flown more than 30 minutes after takeoff.

- The captain should have estimated the endurance using all the available effective information and made the flight plan with sufficient time at least more than 10% of endurance, much more when challenging the new acrobatic maneuver.
- He should have confirmed the remaining fuel by checking the fuel quantity indicator and landed earlier to the Sky Park before the fuel quantity indicator read "ZERO."

Probable causes: It is highly probable that this accident occurred because the aircraft consumed more fuel than the expectation of the captain and the pilot during the sequence, and the Aircraft's fuel was almost exhausted when entering the downwind leg, which made it impossible for the Aircraft to get sufficient engine power to fly back to the Sky Park. As a result, the Aircraft had no choice but to make a forced landing and became damaged. It is probable that the reason of the aircraft consumed more fuel than the expectation and it was almost exhausted was that both of the captain and the pilot didn't grasp the fuel consumption rate based on the past fuel consumption results appropriately and they didn't make the flight plan with sufficient time.

The investigation report of this case is published on the Board's website (issued on July 30, 2015).
http://www.mlit.go.jp/jtsb/eng-air_report/JA111L.pdf

Similar accident: Insufficient preparation (Fuel exhaustion, poor maintenance, etc.)

Date of occurrence	Operator	Category	Pilot's age	Total flight time	Summary of the accident
					Probable causes
July 24, 2011	Private	Small Aircraft	67	1,036	<p>When the Aircraft was taxiing on an apron for flying from Tajima Airfield to Nagoya Airfield, its left main landing gear (L/H MLG) was retracted and the left wing contacted with the ground surface and sustained damage.</p> <p>It is considered highly probable that this accident occurred because the captain and the owner started taxiing the Aircraft without its landing gears down locked, causing the mutual load balance between the landing gear actuators to be loosened and as a result, the L/H MLG to be retracted and the left main wing contacted with the ground surface and sustain damage.</p> <p>As to the fact that the taxiing was started without the landing gears down locked, it is considered that the captain and the owner had not taken the proper measures for maintenance while being aware that the landing gear system did not work properly in the flight just before the accident, and that they had not properly understood the meaning of the situation even though the landing gear position indicator lights were showing the landing gear out of the down lock position in a subsequent pre-flight check.</p>
September 23, 2013	Private	Small Aircraft	47	350	<p>After taking off from Otone Landing Airfield for a sightseeing flight, the engine of the Aircraft, which was flying at an attitude of 1,500ft, suddenly stopped and the Aircraft made a forced landing on a harvested rice field.</p> <p>It is highly probable that this accident occurred due to the check valve mounted between the left fuel tank and the sump tank of the aircraft becoming stuck in the closed position, resulting in the consumption of fuel only from the right fuel tank, leading to an engine stop due to interruption of the fuel supply by depletion of the fuel in the right fuel tank, compelling the making of the emergency landing, and resulting in damage to the aircraft during said emergency landing.</p> <p>It is somewhat likely that the left check valve became stuck in the closed position due to both age-related degradation of the left check valve and the presence of foreign substances, but this could not be determined.</p> <p>It is somewhat likely that misinterpretation of the asymmetrical consumption of the fuel during the preflight check as a temporary and ordinary phenomenon contributed to the accident.</p>
May 30, 2015	Private	Glider	66	659	<p>The Glider was launched from Kirigamine Gliding Field by winch launching for familiarization flight. During launching, the towline broke, and then the Glider to crash.</p> <p>It is probable that the fuses on the towline of the glider broke during launching and the captain tried to perform a turning landing; however, it crashed due to a significantly descent of altitude at low altitude.</p> <p>Regarding the break of fuses, it is highly probable that the low intensity fuses were mounted incorrectly.</p> <p>Regarding the significantly descent of altitude while the glider was circling, it is somewhat likely that the side slip was occurred due to operational unbalance caused by the circling under the insufficient altitude. Moreover, it is somewhat likely that the down draft contributed to the accident.</p>