



## Investigation report

C 19/1999 L

Translation of the Finnish original report

# Unsuccessful water landing of a Lake LA-4-200 “Buccaneer” on Lake Puruvesi on Aug 19, 1999

Lake LA-4-200 “Buccaneer”

N6187V

According to Annex 13 of the Civil Aviation Convention, paragraph 3.1, the purpose of aircraft accident and incident investigation is the prevention of accidents. It is not the purpose of aircraft accident investigation or the investigation report to apportion blame or to assign responsibility. This basic rule is also contained in the Investigation of Accidents Act, 3 May 1985 (373/85) and European Union Directive 94/56/EC. Use of the report for reasons other than improvement of safety should be avoided.



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## SYNOPSIS

On Thursday, 19 August 1999 at about 18.30 hours local time the aircraft a Lake LA-4-200 amphibian, N6187V, was damaged in an unsuccessful water landing on Lake Puruvesi south of Kerimäki. The aircraft swerved violently during touchdown and was severely damaged. The pilot, however, was able to taxi to a nearby shore. The aircraft was owned by Sierra Venture Incorporated (USA) and the pilot was a French citizen. His pilot's license had been issued by the Federal Aviation Administration in the United States. There were two adults and three children on board. There were no injuries.

The Accident Investigation Board, Finland (AIB) was notified of this serious incident by the Air Navigation Services Center for South Finland in accordance with aviation regulation GEN M1-4, dated 24.6.1999. On 20 August 1999, by letter C 19/1999 L, the AIB appointed flight captain Orvokki Kuortti and chief air accident investigator Tero Lybeck (AIB) to investigate the serious incident described above.

Lybeck interviewed the pilot and the local farmer, who had towed the aircraft out of the water, over the phone in the same evening. Police officers from Savonlinna took photographs and a video of the damaged aircraft on the island of Vehkasalo, made a preliminary technical inspection on the aircraft and also blocked off the area until the investigators arrived. On 20 August 1999 police officers interviewed the pilot in Punkaharju. On 23 August 1999 they had a telephone interview with a summer guest, who had been in the area during the landing. On 22 August 1999 Orvokki Kuortti and technical specialist Pertti Lahti investigated the aircraft and interviewed the pilot on Vehkasalo island. On 7 October 1999 the investigators interviewed another summer guest, who had been on Vehkasalo at the time of the incident.

To obtain more detailed information about the incident, the investigators tried to reach the pilot by a letter sent on 8 September 1999 to the address given by him. Furthermore, they tried to telephone the pilot several times between 8 and 12 October 1999 using phone numbers given by him. Unable to contact the pilot, the investigators closed the investigation on 4.4.2000 based on the data available.



## **1 FACTUAL INFORMATION**

### **1.1 History of the flight**

The pilot had planned to fly the amphibian aircraft N6187V from a lake in Punkaharju to Savonlinna airport for refueling, with his wife and three children. After that he intended to fly back to Punkaharju. However, the pilot started the flight as a local flight over Lake Puruvesi and then decided to make a water landing on the lake before flying to Savonlinna. Landing direction was to west-northwest, toward the setting sun. The weather was clear, with small clouds in the sky, wind was almost calm and there were only small ripples on the surface of the lake.

The initial approach was probably normal but at touchdown the airspeed was too high, the nose was too low and the left float hit the water. The float almost broke off, causing the aircraft to turn to port. After that the right float hit the water, it was torn off and the airplane swerved violently to starboard. The left float remained hanging by the fuel line. When the pilot noticed that the aircraft was leaking, he applied full power and taxied to the nearby shore of Vehkasalo island. He left the aircraft in shallow water, from where a local farmer later towed it off on its main gear.

There were no radio communications during the flight.

### **1.2 Basic information**

#### **1.2.1 Aircraft**

The aircraft was a Lake LA-4-200 "Buccaneer" amphibian, registered N6187V. Certificates of registration and airworthiness were valid. According to the copies of the maintenance records, the aircraft had been maintained properly.

#### **1.2.2 Type of flight**

The pilot intended to fly to Savonlinna airport for refueling and then return to Punkaharju. However, he started the flight as a local flight over Puruvesi area and then decided to make a water landing on Lake Puruvesi before flying to Savonlinna airport.

#### **1.2.3 Persons on board**

There were two adults and three children on board. There were no injuries.



#### 1.2.4 Damage to the aircraft

The aircraft was seriously damaged. Pertti Lahti and Orvokki Kuortti made the technical inspection. The following damage was found:

##### **Hull:**

- Both nose gear doors were damaged and the left nose gear door was bent and had almost broken off
- There were small cracks in the hull skin around the hinges of both nose gear doors
- Behind the step there were folds in the hull skin, both in the bottom and on the sides, extending over about two feet's distance
- In the step area one bulkhead was damaged and on its lower right side there were cracks in the hull skin
- The inner glass of the right side window was broken
- Right door was bent and the window was partly loose.

##### **Right wing:**

- The wing float had broken off
- The landing flap was broken and there were dents on it
- The outer bearing bracket of the landing flap was bent.

##### **Left wing:**

- The wing float had broken off but was still hanging from the wing by the fuel tube
- The aileron was broken and there were dents on it
- There were dents on the landing flap
- The hanging wing float had damaged the lower and upper surface of the wing.

The vertical stabilizer, air rudder and water rudder were intact. The horizontal stabilizer, elevator and both elevator trim tabs were intact. The engine operated normally during the test run. Ailerons, elevator, rudder and both rudder trim tabs worked normally. Landing flaps were in landing position, but their operation could not be tested because of the damage sustained.

Nothing indicated that the amphibian would have hit a sunken log or a rock.

During the technical inspection the investigators noticed that some of the cabin floor plates were loose, and they could not find all of the screws in the cabin. The worn-out condition of the cabin floor and screw holes suggested that the floor had been removed far more often than is necessary for normal maintenance. The cabin floor is essential for the structural strength of this aircraft type. In this case the structural strength of the floor



probably did not meet the structural design parameters of the aircraft, which may have aggravated the damage.

### **1.2.5 Crew members**

The pilot had a commercial pilot's license issued by FAA (USA).

Class and number: Commercial, 2461651, issued on July 8, 1996

Medical certificate: First class, issued on April 26, 1999

Ratings: Airplane single engine land / ASEL  
Airplane multi engine land / AMEL  
Airplane single engine sea / ASES  
Instrument rating

The pilot's flight experience was calculated from the copies of logbook pages given by the pilot. His total flight experience and experience on type was sufficient for this flight.

Total flying hours: 1335 h

Water landings, last three months: 10 landings

Water landings, last four months: 66 landings

### **1.2.6 Weather**

The weather was dry and there were small cumulus clouds typical of fair weather. Wind was very light and there were only very small ripples on the water surface. Landing direction was toward the setting sun.

### **1.2.7 Weight and balance**

There were two adults on the front seats and three children on the back seat. Weight and balance were within limits.

### **1.2.8 Survival aspects**

The pilot was able to taxi to the shore of an island, where the occupants could reach dry land on their own.



## 2 ANALYSIS

Since there were no eyewitnesses to the water landing, this analysis is based on the pilot's report, aircraft damage and knowledge of the prevailing conditions.

### 2.1 Water landings as described in flight manual

**Normal conditions:** Step landing. Approach speed 70-80 mph (IAS). A slight amount of power is used to set the plane down on the main hull in a flat attitude. After the initial contact is made with the water, the throttle should be gradually reduced. When close to the water's surface, the airplane must always be wings level and the nose should never be allowed to drop below the level.

**Rough water conditions:** Full stall landing. In cases of rough water or where uneven or crossing wave patterns exist, a full stall landing is recommended at all times. Approach speed 70 mph (IAS). Slow deceleration; stall occurs at the moment of touchdown.

**Glassy water conditions:** Glassy water landing should be used always when depth perception is difficult. The approach speed is 65 mph (IAS); enough power should be used to control the let-down between 100 and 200 fpm. Power should be eased off when water contact is heard, but no change should be made in the elevator setting.

### 2.2 The unsuccessful water landing

The pilot decided to land on Lake Puruvesi before flying to Savonlinna airport. He was trying to make a normal step landing, because he thought the conditions were suitable for that. The investigators gathered weather reports and interviewed persons, who had been in the area during that time. They came to the conclusion that the conditions would have required a glassy water landing. The landing direction was toward the setting sun, the wind was almost calm and there were small fair weather cumulus clouds in the sky, reflecting from the nearly calm water surface. Therefore depth perception has probably been difficult.

The investigators believe that the pilot misjudged the height and therefore the airplane hit the water with too much airspeed, nose too low and left wing lower than the other. The first water contact occurred in the nose gear door area, damaging the doors and the surrounding area.

The left wing float hit the water almost simultaneously with the hull. The float almost broke off and the airplane turned abruptly to port. The centrifugal force then caused the right float to slam down. The very high vertical force made the float to plunge into the water creating a large drag force, which tore the float off and made the airplane swerve sharply back to starboard.



The airplane came to rest with its nose pointing starboard of its original course. The right float was missing and the left float was only hanging by the fuel tube.

Damage to the hull was caused during the loop and the swerve. The floats damaged the wings, the left aileron and the landing flaps.

When the pilot noticed that the hull was leaking, he applied full power and taxied to a nearby shore of an island. The left float, which was still hanging along, hit the wing several times causing more damage to that wing.



### **3 CONCLUSIONS**

#### **3.1 Findings**

1. The pilot's license was valid.
2. Aircraft certificate of registration and certificate of airworthiness were valid.
3. Weight and balance were within limits.
4. There were two adults on the front seats and three children on the back seat.
5. The pilot failed to notice the risk of misjudging the height under prevailing conditions and tried to make a normal step landing instead of a glassy water landing, which would have been more suitable.
6. The aircraft hit the water with too much airspeed, nose too low and the left wing lower than the other. Nose gear doors and their surrounding areas were damaged.
7. The left wing float hit the water, almost broke off and made the airplane water loop to port.
8. After the right wing float had slammed down and plunged into the water, it was torn off and made the aircraft swerve sharply back to starboard.
9. The rest of the hull damage was caused when the aircraft was swerving uncontrolled in the water. Both wings were damaged by the wing floats.
10. When the pilot noticed that the hull was leaking, he applied full power and taxied to a nearby shore of an island.
11. The occupants were able to leave the aircraft and climb to the shore on their own.
12. During the inspection it was found out that parts of the cabin floor were loose.
13. It is possible that the decreased structural strength of the cabin floor did not meet the structural design parameters of the aircraft, which may have aggravated the hull damage.

#### **3.2 Probable cause**

The pilot overlooked the risk of misjudging the height of the aircraft in the prevailing conditions and tried to make a normal step landing instead of a more suitable glassy water landing. Because the pilot overestimated the height, the airplane hit the water with too much airspeed, nose too low and the left wing lower than the other.



#### **4 SAFETY RECOMMENDATIONS**

Pilots flying LA-4-200 "Buccaneer" aircraft should make sure that the cabin floor is undamaged and properly installed before flight.

Helsinki, April 4, 2000

Orvokki Kuortti

Tero Lybeck