



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Mokuleia, Hawaii	Accident Number:	ANC23FA003
Date & Time:	November 5, 2022 08:11 Local	Registration:	N444EZ
Aircraft:	Airborne Windsports Edge Xt-912L	Aircraft Damage:	Substantial
Defining Event	Aircraft structural failure	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

****This report was modified on January 22, 2025. Please see the docket for this accident to view the original report.****

The flight instructor and student were conducting a local area discovery flight in the weight-shift-control light sport aircraft. An onboard video of the accident flight and ADS-B data revealed that about 28 minutes into the flight the aircraft entered a right turn as the flight instructor stated another way for them to lose altitude was to “do spirals.” The aircraft then continued a tight descending right turn, and the descent rate and airspeed rapidly increased to near the aircraft’s maneuvering limitations for both bank angle and airspeed. As the aircraft rolled out of the right turn and near a wings-level attitude, three of the battens connecting the left-wing fabric to the wing structure released at the trailing edge. The left wing subsequently began to flutter, and the aircraft rapidly rolled left and entered a spiral dive, from which the pilot was unable to recover before impact with terrain.

A Service Instruction issued by the aircraft manufacturer listed three different factors that can cause the hinged batten to unload: 1) damage to the latch from incorrect loading of the fitting, 2) overtension of the batten within the pocket, and 3) operation outside the placarded limitation of the aircraft. While the investigation was not able to determine the state of battens before the accident, a performance study determined that the aircraft banked near its maximum recommended bank angle of 60° and near its maximum maneuvering speed of 73 kts in a right turn during the descent.

The battens that separated during the flight were not recovered and therefore could not be examined. Postaccident examinations of the airframe and engine revealed no additional evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The parachute pin was removed and the parachute was partially deployed. It is likely that the parachute was deployed without enough altitude remaining to fully open and arrest the descent.

Ethanol was detected at low levels in the flight instructor's liver and muscle tissue specimens collected during a postmortem examination. Some or all of the small amounts of detected ethanol may have been from postmortem production, and it is unlikely that ethanol effects contributed to the crash.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Structural failure of the wing for undetermined reasons, which resulted in a loss of control.

Findings

Aircraft (A1)	Flight surfaces (wing) - Failure
Aircraft (A1)	(general) - Attain/maintain not possible

Factual Information

History of Flight

Maneuvering	Aircraft structural failure (Defining event)
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On November 5, 2022, about 0811 Hawaii-Aleutian standard time, an Airborne Windsports Edge XT-912-L weight-shift-control light sport aircraft, N444EZ, was substantially damaged when it was involved in an accident near Mokuleia, Hawaii. The flight instructor and initial/introductory flight training student were fatally injured. The aircraft was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the operator, Paradise Air Hang Gliding, the flight was a discovery flight lesson and should have lasted about 30 minutes. However, during a subsequent conversation with a family member they said no instruction was provided and they considered their child a passenger on the flight.

When the aircraft did not return, another pilot from the operator went to look for the aircraft, and he eventually spotted the wreckage about 2 miles west of the airport. A witness close to the accident site stated that the engine was running, and the aircraft descended in a nose-low attitude until impact.

According to ADS-B flight track data and video from a Go-Pro camera recovered from the aircraft wreckage, the aircraft taxied onto the runway for takeoff from Dillingham Airfield (HDH) about 0739. The aircraft flew east of the airport, maneuvering at varying altitudes and making a few 360° turns before turning back to the west. The aircraft flew along the coast towards Ka'ena Point, then made a left climbing turn toward HDH. The aircraft reached a maximum altitude of 5,670 ft mean sea level (msl), then descended to an altitude of 1,200 ft, and then climbed to 2,700 ft. The airplane completed a left 360° and continued to climb. After a second left turn the aircraft began a descent from 2,700 ft (see Figures 1 and 2).

As the aircraft entered a right turn at 2,100 ft, the flight instructor told the student another way for them to lose altitude was to “do spirals.” The aircraft then entered a tight descending right turn, rolling to near the recommended limit of 60° and increasing airspeed to near the maneuvering limit of 73 kts. As the aircraft rolled out of the right turn to a near wings-level attitude, three battens connecting the wing fabric to the wing structure released at the trailing edge of the left wing (see Figure 3). The left wing subsequently began to flutter, and the aircraft rapidly rolled left and entered an uncontrolled descending spiral dive. The last track data was observed at 0810, as the aircraft descended through 700 ft msl, at 20 knots.



Figure 1. ADS-B flight track for N444EZ, which depicts both outbound and inbound flight tracks.

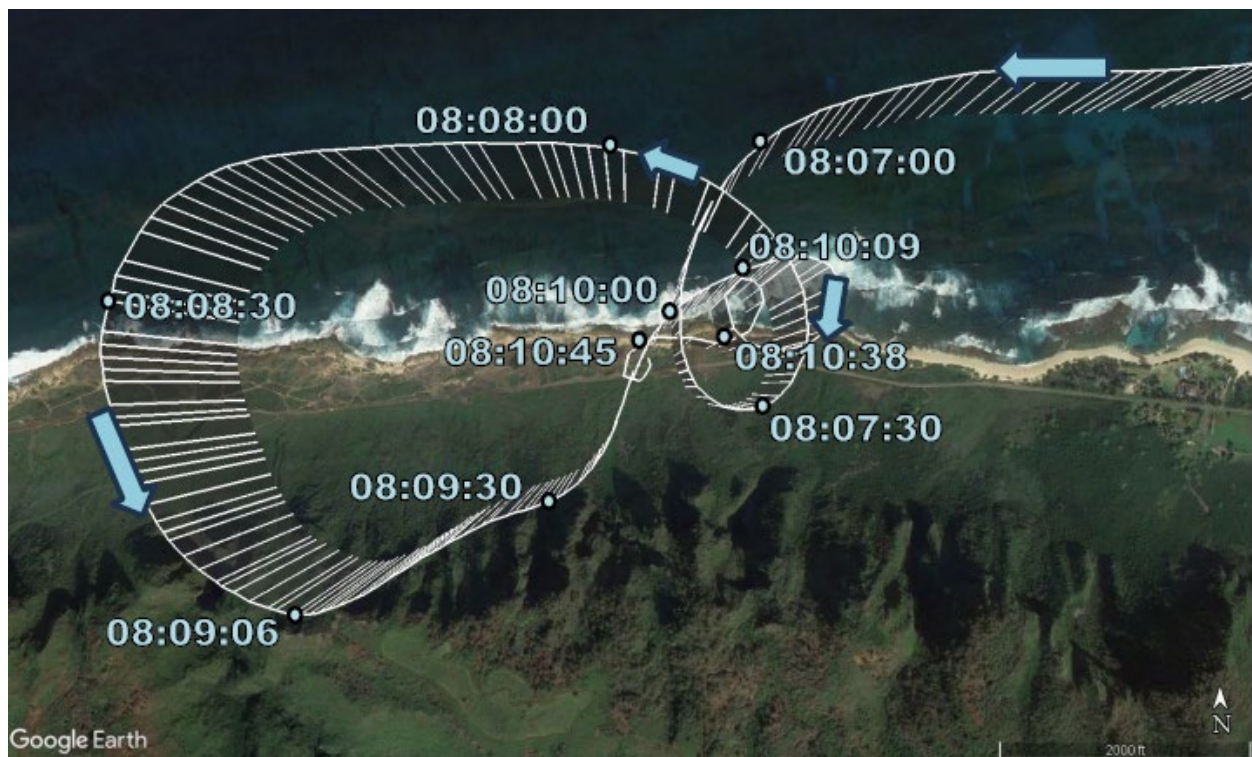


Figure 2. Overhead view of the ADS-B flight track which depicts the last portion of the flight.

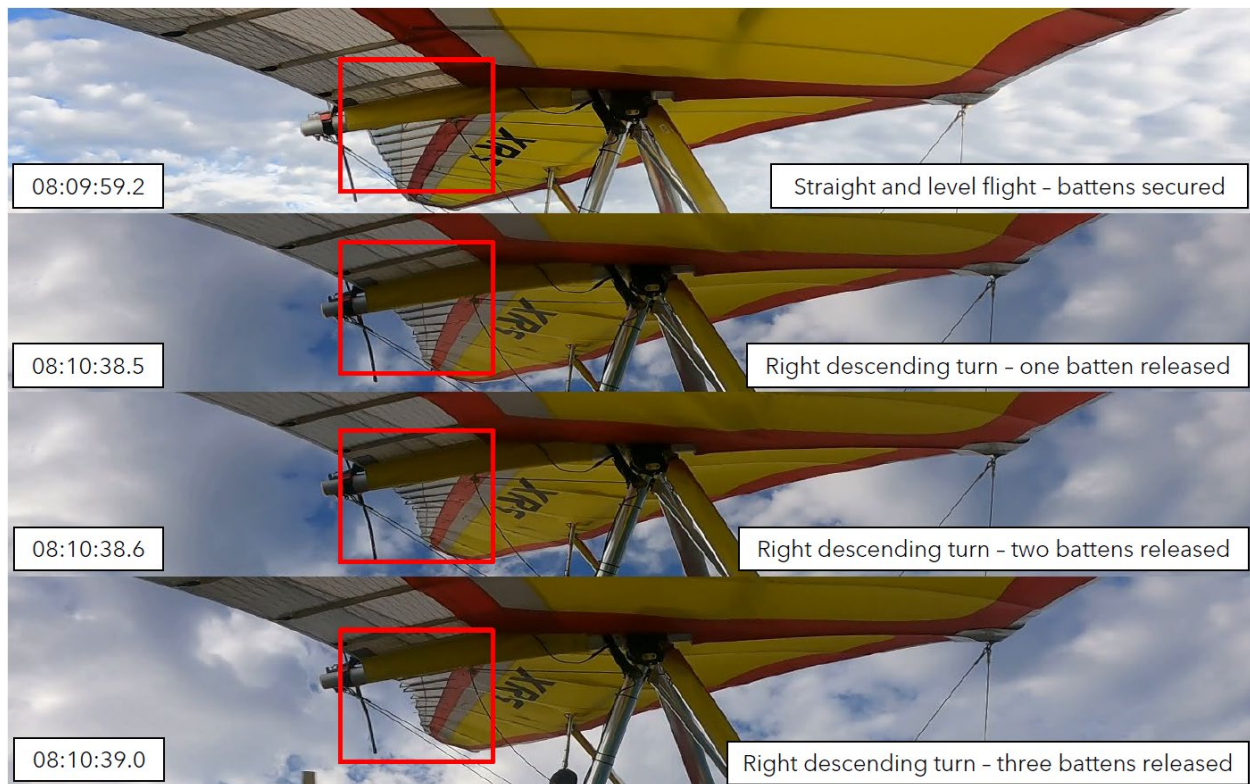


Figure 3. Sequence of four images from the GoPro camera that captured the batten end fittings release.

Pilot Information

Certificate:	Flight instructor	Age:	58, Male Occupant #1; 17, Male Occupant #2
Airplane Rating(s):	Single-engine land	Seat Occupied:	Front Occupant #1; Rear Occupant #2
Other Aircraft Rating(s):	None	Restraint Used:	Lap only Occupant #1; 4- point Occupant #2
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	Sport pilot	Toxicology Performed:	[SAFTIToxicology Performed]
Medical Certification:	None Occupant #1	Last FAA Medical Exam:	[SAFTILastFAAM edicalExamDate]
Occupational Pilot:	Yes Occupant #1; No Occupant #2	Last Flight Review or Equivalent:	January 31, 2022 Occupant #1
Flight Time:	(Estimated) 450 hours (Total, all aircraft), 450 hours (Total, this make and model), 430 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft) Occupant #1; 0 hours (Total, all aircraft), 0 hours (Total, this make and model) Occupant #2		

The flight instructor's total flight experience was provided by the operator. His pilot logbook was not located.

Aircraft and Owner/Operator Information

Aircraft Make:	AIRBORNE WINDSPORTS	Registration:	N444EZ
Model/Series:	Edge XT-912L	Aircraft Category:	Weight-shift
Year of Manufacture:	2016	Amateur Built:	[SAFTIAmateurBuilt]
Airworthiness Certificate:	Special light-sport (Special)	Serial Number:	XT-912-0508
Landing Gear Type:	Tricycle;	Seats:	2
Date/Type of Last Inspection:	August 11, 2022 100 hour	Certified Max Gross Wt.:	992 lbs
Time Since Last Inspection:	[SAFTITimeSinceLastInspection Hrs]	Engines:	1 Reciprocating
Airframe Total Time:	1455.2 Hrs	Engine Manufacturer:	Rotax
ELT:	[SAFTIELT]	Engine Model/Series:	912UL
Registered Owner:	Marc Hill	Rated Power:	80 Horsepower
Operator:	NaluVentures LLC	Operating Certificate(s) Held:	None
Operator Does Business As:	NaluVentures LLC	Operator Designator Code:	[SAFTIOperatorDesignatorCode]

The aircraft was owned by the flight instructor and operated by Paradise Air Hang Gliding. The operator performed most of the airplane's maintenance, including the annual and 100-hour inspections.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	PHHI, 840 ft msl	Distance from Accident Site:	13 Nautical Miles
Observation Time:	07:55:00 Local	Direction from Accident Site:	117°
Lowest Cloud Condition:	Scattered / 4900 ft AGL	Visibility	10 miles
Lowest Ceiling:	Broken / 6000 ft AGL	Visibility (RVR):	[SAFTIVisualRangeFT]
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	130°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.13 inches Hg	Temperature/Dew Point:	25°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Mokuleia, HI (PHDH)	Type of Flight Plan Filed:	None
Destination:	Mokuleia, HI (PHDH)	Type of Clearance:	None
Departure Time:	07:40 Local	Type of Airspace:	Class G

A Global Data Assimilation System (GDAS) sounding showed average winds in the area of the accident were equal or greater to 14 knots at or below 5,000 ft.

Airport Information

Airport:	DILLINGHAM AIRFIELD HDH	Runway Surface Type:	[SAFTIRunwaySurfaceType]
Airport Elevation:	14 ft msl	Runway Surface Condition:	Dry
Runway Used:	[SAFTIRunwayID]	IFR Approach:	None
Runway Length/Width:	[SAFTIRunwayLengthFTRunwayWidthFT]	VFR Approach/Landing:	None

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Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	[SAFTIInjuryGroundTotal]	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	21.579707°, -158.23777°

Postaccident examination of the fuselage revealed it was intact and impact damaged. Flight control continuity was confirmed from the control inputs to the control surfaces. The wing mast was impact damaged; the mast safety cable remained attached. The safety pin was removed from the parachute and it was partially deployed. The battens that separated during the flight were not recovered and therefore could not be examined.

The engine remained attached to the airframe. The carburetors were separated from the engine and impact damaged. The fuel tank was breached and empty. All three propeller blades remained attached to the hub; the outboard portions of all the blades were impact separated.

Additional Information

The manufacturer issued AirBorne Service Instruction SB-019, Issue 1, dated January 9, 2015. The instruction states there are several factors that can cause the hinged batten fittings to unload.

1. Damage to the latch from incorrect unloading of the fitting.
2. Over tension of the batten within the pocket.
3. Operation outside the placarded limitation of the aircraft.

The Aircraft Operating Instructions advise not to exceed 60°. Additionally, the maneuvering speed, V_a , for the aircraft with the XR-S wing is listed as 73 kts.

Injuries to Persons

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Damage to Aircraft

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Other Damage

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Communications

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Flight recorders

The operator had installed a GoPro HERO9 digital camera mounted on the right wing pointing toward the pilot and passenger.

Medical and Pathological Information

The Department of the Medical Examiner, City and County of Honolulu, performed the autopsy of the pilot. According to the autopsy report, the pilot's cause of death was

massive blunt force trauma, and the manner of death was accident. The Federal Aviation Administration (FAA) Forensic Sciences Laboratory performed toxicological testing of the postmortem tissue of the pilot. Ethanol was detected in liver tissue and muscle at 0.012 g/hg and 0.024 g/hg, respectively.

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance. FAA regulation imposes strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater. Alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by extensive traumatic injury.

Fire

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Survival Aspects

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Tests and Research

The National Transportation Safety Board conducted a performance study for this accident. The study included a review of ADS-B and GoPro video data. The data revealed the aircraft began a steep descending turn near the end of flight. The aircraft rapidly gained speed to near its V_a while in a bank near its maximum recommended bank angle of 60° . For about 10 seconds of the right turn the aircraft was near the maximum recommended bank angle and V_a . Shortly after, three left batten hinges released, causing the left wing to flutter before the aircraft eventually entered a left spiral dive.

Organizational and Management Information

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Useful or Effective Investigation Techniques

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[SAFTISafetyMessage]

Administrative Information

Investigator In Charge (IIC):	Hill, Millicent		
Additional Participating Persons:	David Welch; FAA/FSDO; Honolulu, HI Denise Sanders; Paradise Air Hang Gliding; Haleiwa, HI		
Original Publish Date:	November 14, 2024	Investigation Class:	3
Note:	[SAFTITravelText]		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=106253		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available.