Aviation Investigation Final Report

Location:	Arcadia, Florida	**Accident Number:**	ERA11LA451
Date & Time:	August 12, 2011, 14:40 Local	**Registration:**	N8737Q
Aircraft:	Cessna U206F	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	1 Minor, 4 None
Flight Conducted Under:	Part 91: General aviation - Other work use		

Analysis

The pilot stated that during the water takeoff, he used 10 degrees of flaps to get the airplane on "plane." Once the airplane began to climb, he added another 10 degrees of flaps to climb. The airplane climbed to about 400 feet but would not maintain altitude. There was no loss in engine power, and the airplane began to descend. The pilot executed a forced landing into a field, and the airplane collided with trees. After recovery of the airplane, the engine was removed and test run. No preaccident mechanical malfunctions or failures were found that would have precluded normal engine operation.

A review of the performance chart revealed that the airplane, in a clean configuration and at a maximum gross weight of 3,800 pounds, should have been able to maintain a rate of climb of 600 feet per minute at about 65 knots. The density altitude at the time of the accident was about 2,300 feet. Although the pilot estimated the gross weight was 3,695 pounds, postaccident weight and balance calculations revealed the estimated weight of the airplane at takeoff was 3,855 pounds, which was 55 pounds above the maximum allowable gross weight. High density altitude and increased gross weight both adversely affect an airplane's climb performance. The presence of either or both conditions requires pilot vigilance to maintain adequate airspeed during takeoff and climb. Aircraft performance can become marginal in high density altitude conditions, and it may be necessary to reduce aircraft gross weight for safe operations. It is likely that the high density altitude combined with operation over the airplane’s maximum permitted takeoff gross weight resulted in the airplane's inability to climb or maintain altitude. These factors would both reduce the performance of the airplane.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to take off in high density altitude conditions with the airplane over its maximum gross weight, due to the pilot's improper weight and balance calculations, which resulted in the airplane's inability to climb or maintain altitude.

Findings

Personnel issues	Weight/balance calculations - Pilot
Aircraft	Maximum weight - Capability exceeded
Environmental issues	High density altitude - Effect on operation

Factual Information

History of Flight

Prior to flight	Aircraft loading event
Initial climb	Collision during takeoff/land (Defining event)

On August 12, 2011, at 1440 eastern daylight time, a Cessna U206F, N8737Q, registered to Coastal Aero LLC and operated by Key West Seaplanes, collided with trees during a forced landing in the vicinity of Arcadia, Florida. The airplane sustained structural damage to the wings, fuselage, and a post-crash fire ensued. Visual meteorological conditions prevailed and no flight plan was filed. The sightseeing flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. The certificated commercial pilot sustained minor injuries and the four passengers were not injured. The flight was originating at the time of the accident.

The pilot stated that during the water takeoff he used 10 degrees of flaps to get the airplane on "plane." Once the airplane began to climb, he added another 10 degrees of flaps to climb out. He said that the airplane climbed to approximately 400 feet and would not maintain altitude. He said that the engine rpm remained high but the airplane began to descend. He initiated a forced landing into a wooded area and the airplane collided with trees. The pilot did not report any flight control anomalies prior to the accident.

The airplane came to rest in a wooded area. Trees along the crash debris line exhibited evidence of propeller slant cuts. Examination of the wreckage by a Federal Aviation Administration inspector revealed the engine assembly was separated from the firewall. The forward cabin area sustained extensive fire damage. Continuity of the flight controls was confirmed from the cabin area aft to all flight control surfaces.

The engine was recovered to an authorized repair facility for an engine examination. The engine was started and the throttle was gradually increased to full throttle. The engine produced 2,400 rpm, with manifold pressure at 29 inches, and the oil pressure was at 60 PSI. The engine throttle was reduced to near idle. The throttle was rapidly accelerated to full power twice and the engine performed without any hesitation, stumbling, or interruption in power. After approximately eight and a half minutes of run time, the engine power was reduced to near idle, and the engine idled smoothly until being shut down. There were no anomalies noted during the engine run that would have prevented normal operation. The logbooks were not recovered for review. According to the pilot, the logbooks were in the airplane at the time of the accident and were destroyed in the post crash fire.

The airplane had a certificated takeoff gross weight of 3,800 pounds, according to the Supplemental Type Certificate (STC) (SA01185CH), with an associated center of gravity between +40.0 to +47.4 inches. Utilizing the most recent weight and balance record, and the

weights of the pilot and passengers, 45 gallons of fuel, engine oil, and baggage, the estimated weight of the airplane was at least 3,855 pounds with an associated center of gravity of 45.10 inches.

The pilot indicated in a statement that the maximum gross weight of the airplane was 3,800 pounds. He reported that the takeoff weight at the time of the accident was 3,695 pounds, with an associated center of gravity of 44.94 inches. The passenger and baggage weights that the pilot provided were estimated. A review of the supplement flight manual section on weight and balance warns that it is the responsibility of the pilot to ensure that the amphibian is loaded properly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.

A review of recorded data from the Punta Gorda Airport (PGD) automated weather observation station revealed that six minutes after the accident, conditions were calm wind, visibility of 10 miles, cloud conditions few at 8,000 feet above ground level, temperature 31 degrees Celsius, dew point 19 degrees Celsius, and altimeter 29.87 inches of mercury. PGD is located about 26 miles northwest of the accident site. The density altitude at the time of the accident was approximately 2,297 feet. Review of the performance chart for an airplane with the same STC modification revealed that the airplane, in a clean configuration at a maximum gross weight of 3,800 pounds, should have been able to maintain a rate of climb of 600 feet per minute at approximately 65 knots. High density altitude and increased gross weight both adversely affect an airplane's climb performance. The presence of either or both conditions requires pilot vigilance to maintain adequate airspeed during takeoff and climb.

A review of the Federal Aviation Administration Accident Prevention Program for Density Altitude states that even at lower elevations, aircraft performance can become marginal and it may be necessary to reduce aircraft gross weight for safe operations. Therefore, it is advisable, when performance is in question, to schedule operations during the cool hours of the day, early morning or late afternoon, when forecast temperatures are expected to rise above normal. Early morning and late evening are sometimes more ideal for both departure and arrival.

Pilot Information

Certificate:	Commercial	**Age:**	44,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	June 30, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 12, 2011
Flight Time:	(Estimated) 14000 hours (Total, all aircraft), 3500 hours (Total, this make and model), 13900 hours (Pilot In Command, all aircraft), 160 hours (Last 90 days, all aircraft), 50 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N8737Q
Model/Series:	U206F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20603490
Landing Gear Type:	N/A; Amphibian	**Seats:**	6
Date/Type of Last Inspection:	June 12, 2011 Annual	**Certified Max Gross Wt.:**	3800 lbs
Time Since Last Inspection:	1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2420 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	C91 installed, not activated	**Engine Model/Series:**	IO 520 SERIES
Registered Owner:	COASTAL AERO LLC	**Rated Power:**	285 Horsepower
Operator:	Key West Seaplanes	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PGD,26 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	14:46 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	Broken / 4300 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	32°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Arcadia, FL	**Type of Flight Plan Filed:**	None
Destination:	Arcadia, FL	**Type of Clearance:**	None
Departure Time:	14:40 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	4 None	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 4 None	**Latitude, Longitude:**	27.219444,-81.838058(est)

Administrative Information

Investigator In Charge (IIC):	Alleyne, Eric
Additional Participating Persons:	Linda M Nevin; FAA/FSDO; Tampa, FL Chris Lang; Continental Motors Inc.; Mobile, AL
Original Publish Date:	December 11, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=81473