Aviation Investigation Final Report

Location:	Louisville, Kentucky	**Accident Number:**	ERA13LA279
Date & Time:	June 11, 2013, 22:30 Local	**Registration:**	N118JD
Aircraft:	Cessna 172M	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	4 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot could not recall any information about the accident except that the airplane had ascended to about 200 ft above ground level. According to Federal Aviation Administration radar data, the airplane had performed three takeoffs and landings, and the accident occurred during the initial climb after the fourth takeoff. The airplane impacted the ground in a right-wing, nose-down attitude about 430 ft from the departure end of the runway. No mechanical abnormalities were noted with the engine or airframe that would have precluded normal operation.

Postaccident examination of the airplane revealed that the flaps were set at 30 degrees. According to the Pilot's Operating Handbook, the flaps should be up for normal and obstacle-clearance takeoffs, and flap settings greater than 10 degrees are not recommended at any time for takeoff. Further, calculations of the airplane's weight and balance revealed that the airplane was over the maximum allowable takeoff weight by 114 pounds before the airplane's initial departure. The exact weight at the time of the accident could not be determined; however, it is likely that the airplane was still operating above the maximum allowable weight. Although the airplane had taken off and landed three times while overweight without incident, it is likely that the improper flap setting increased the drag and, in combination with the airplane's overweight condition, degraded the airplane's climb performance, which resulted in the airplane experiencing an aerodynamic stall at a low altitude.

Probable Cause and Findings

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

The pilot's failure to set the correct flap position before takeoff and his inadequate preflight planning, which resulted in the operation of the airplane over the maximum allowable gross weight, both of which led to an aerodynamic stall at too low an altitude at which to recover.

Findings

Aircraft	Configuration - Incorrect use/operation
Aircraft	Maximum weight - Capability exceeded
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Use of equip/system - Pilot
Environmental issues	(general) - Contributed to outcome
Personnel issues	Weight/balance calculations - Pilot

Factual Information

History of Flight

Prior to flight	Aircraft loading event
Takeoff	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On June 11, 2013, about 2230 eastern daylight time, a Cessna 172M, N118JD, operated by a private individual, was substantially damaged when it impacted terrain during takeoff from Bowman Field (LOU), Louisville, Kentucky. The private pilot and three passengers were seriously injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

The pilot was unable to recall any information about the accident; however he did report that the altitude of the occurrence was about "200 feet [above ground level]." Review of radar data provided by the Federal Aviation Administration (FAA) revealed the airplane was performing takeoff and landings to runway 33 at LOU. The airplane impacted the ground about 430 feet from the departure end of the runway in a right wing low, nose down attitude.

Pilot Information

Certificate:	Private	**Age:**	17
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	October 30, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 17, 2013
Flight Time:	58.2 hours (Total, all aircraft), 58.2 hours (Total, this make and model), 22.2 hours (Pilot In Command, all aircraft), 5.5 hours (Last 90 days, all aircraft), 1.3 hours (Last 30 days, all aircraft)		

According to FAA records, the pilot, age 17, held a private pilot certificate for airplane single-engine land. The certificate was issued on February 17, 2013. His most recent FAA third-class airman medical certificate was issued on October 30, 2012. According to the pilot's logbook, as of May 19, 2013, the pilot had accumulated 58.2 total hours of flight experience; of which, all of those hours were in the same make and model as the accident airplane. The pilot had accumulated 9.6 hours total night time experience, of which 1.4 hours of night time experience were within the 90 days preceding the accident, including four night takeoff and

landings.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N118JD
Model/Series:	172M	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	17265574
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	May 14, 2013 Annual	**Certified Max Gross Wt.:**	2300 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	8322 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-320
Registered Owner:	On file	**Rated Power:**	150 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The four-seat, high-wing, fixed tricycle-gear airplane, was manufactured in 1975. It was powered by a Lycoming O-320-E2D, 150-hp engine. Review of the airplane's maintenance records revealed that its most recent annual inspection was completed on March 1, 2013. At the time of inspection, the airplane had accumulated 8,173.5 total hours in service. The engine had accumulated approximately 1,145 total hours of time in service since major overhaul. The most recent 100-hour inspection was completed on May 14, 2013, and had 8,322.77 total hours in service.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	LOU,546 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	22:53 Local	**Direction from Accident Site:**	140°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	26°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Louisville, KY (LOU)	**Type of Flight Plan Filed:**	None
Destination:	Louisville, KY (LOU)	**Type of Clearance:**	None
Departure Time:	22:30 Local	**Type of Airspace:**	Class C

The 2253 recorded weather at LOU, included wind from 160 degrees at 3 knots, 10 miles visibility, clear skies, temperature 26 degrees C, dew point 19 degrees C, and a barometric altimeter setting of 29.95 inches of mercury.

According to the U.S. Naval Observatory, on the day of the accident, official sunset was at 2106, the end of civil twilight was at 2138, and official moonset was at 2311. The moon phase was waxing crescent with 8 percent of the moon's visible disk would have been illuminated.

Airport Information

Airport:	Bowman Field LOU	**Runway Surface Type:**	Asphalt
Airport Elevation:	546 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	33	**IFR Approach:**	None
Runway Length/Width:	3579 ft / 75 ft	**VFR Approach/Landing:**	Touch and go;Traffic pattern

The airport was a publically owned airport and at the time of the accident had an operating control tower that operated between the hours of 0700 and 2200. The airport was equipped with two runways designated as 6/24 and 15/33. The runways were reported as "in fair condition" or "in good condition" at the time of the accident. Runway 6/24 was a 4,326 -foot-long by 75-foot-wide runway and runway 15/33 was a 3,579-foot-long by 75-foot-wide runway. The airport was 546 feet above mean sea level. Both runways were equipped with medium intensity runway lights (MIRL) that were pilot activated over the common traffic advisory frequency. The lights were tested following the accident and stayed on for 15 minutes when activated.

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Serious	**Latitude, Longitude:**	38.232498,-85.669441(est)

According to photographs provided by an FAA inspector, after impact the airplane pivoted around the nose before coming to rest upright, nose down, on a golf course. Both propeller blades exhibited chordwise scratching and the wings and fuselage sustained substantial damage.

Postaccident examination by an FAA inspector and a representative of the airplane's manufacturer revealed that the flap actuator jackscrew measured about 4 inches, which correlated to a 30 degree flap position. Postaccident examination of the airplane and engine did not reveal any malfunctions or failures that would have precluded normal operation.

Additional Information

The pilot reported to an FAA inspector that he did a weight and balance prior to accident flight. When asked if he still had a copy of it, he said he "did it in his head." Calculation of the airplane's weight and balance information revealed that the airplane's total weight was 2414 pounds; the maximum allowable takeoff weight was 2300 pounds.

Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25A)

Chapter 8, "Weight and Balance," states in part "Compliance with the weight and balance limits of any airplane is critical to flight safety. Operating an airplane above the maximum weight limitation compromises the structural integrity of the airplane and adversely affects its performance…an overloaded airplane may not be able to leave the ground, or if it does become airborne, it may exhibit unexpected and unusually poor flight characteristics…excessive weight reduces the flight performance of an airplane in almost every respect. The most important performance deficiencies of the overloaded airplane are…higher stalling speed."

Cessna 172M Pilot Operating Handbook

Section 2, "Takeoff" states in part "Wing Flap Settings – Normal and obstacle clearance takeoffs are performed with wing flaps up… Flap settings greater than 10 degrees are not recommended at any time

for takeoff…" Also, a review of the "normal take-off" and "maximum performance take-off" stated in part that, the wing flaps setting is zero degrees.

Administrative Information

Investigator In Charge (IIC):	Neylon, John
Additional Participating Persons:	Shannon Bengeyfield; FAA/FSDO; Louisville, KY Steve Miller; Cessna Aircraft; Wichita, KS James M Childers; Lycoming Engines; Williamsport, PA
Original Publish Date:	June 9, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=87162