



# Aviation Investigation Final Report

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<b>Location:</b>	Waterford, Michigan	<b>Accident Number:</b>	CEN13FA364
<b>Date &amp; Time:</b>	June 21, 2013, 13:40 Local	<b>Registration:</b>	N9926Q
<b>Aircraft:</b>	Cessna 172M	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	4 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

Air traffic control tower personnel saw the airplane lift off the runway and attain an altitude of about 100 feet. A pilot approaching the runway for landing saw the airplane lift off and noticed it was not climbing. He saw the airplane "lagging" and "wallowing in the air with flaps extended." Shortly after, the accident pilot advised an air traffic controller that he was "a little overweight" and would need to return to the airport and land. The air traffic controller cleared the airplane to land on the parallel runway or the grass area surrounding the runways. The pilot did not respond. Several witnesses near the airport, including the pilot in the landing airplane, saw the accident airplane impact the ground and burst into flames. A postaccident examination revealed that the wing flaps were fully extended (40 degrees). Weight and balance calculations indicated the airplane was slightly under maximum gross weight. Postaccident examinations revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.

The pilot received his private pilot certificate almost 2 months before the accident and had flown a Cirrus SR20 almost exclusively. He reportedly had flown the Cessna 172, the accident airplane make and model, for a few hours, but this report could not be confirmed. Cirrus SR20 takeoffs are normally made using 50 percent flaps, whereas Cessna 172M takeoffs are normally made with the flaps up. The pilot most likely configured the airplane incorrectly for takeoff and the airplane was unable to climb due to his lack of familiarity with the airplane make and model.

## Probable Cause and Findings

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

The pilot's failure to retract the wing flaps before attempting to take off, due to his lack of familiarity with the airplane make and model, which prevented the airplane from maintaining adequate altitude for takeoff.

## Findings

<b>Personnel issues</b>	Forgotten action/omission - Pilot
<b>Aircraft</b>	Climb capability - Attain/maintain not possible
<b>Personnel issues</b>	Total experience w/ equipment - Pilot

## Factual Information

### History of Flight

<b>Initial climb</b>	Loss of control in flight (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

#### HISTORY OF FLIGHT

On June 21, 2013, about 1340 eastern daylight time, a Cessna 172M, N9926Q, impacted terrain during takeoff at the Oakland County International Airport (KPTK), Waterford, Michigan. The pilot and three passengers were fatally injured. The airplane was destroyed. The airplane was registered to and being operated by Flight 101, LLC, Waterford, Michigan, under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions (VMC) prevailed, and no flight plan had been filed. The local flight was originating at the time of the accident.

According to Federal Aviation Administration (FAA) records, the pilot of N9926Q contacted KPTK ground control at 1328 and requested taxi instructions for a visual flight rules (VFR) flight to the west. He indicated he had received the current Automatic Terminal Information Service (ATIS) information. At 1338, KPTK local control cleared N9926Q for takeoff on runway 09L from intersection M (Mike). Control tower personnel saw the airplane lift off the runway and attain an altitude of about 100 feet. Shortly thereafter, at 1340, the pilot advised that he was "a little overweight" and would need to return and land. He was cleared to land on runway 09R or on the grass area surrounding the runways. There was no reply. The airplane was seen to impact the ground. A post-crash fire ensued.

There were several witnesses to the accident. One witness was working in a nearby hangar and heard an airplane having "engine trouble." He saw the airplane about 100 feet in the air and the engine was "spitting and sputtering." The airplane was crabbing about 30 degrees while flying straight in line with the runway. The engine became "quiet," then regained power and began "spitting and sputtering" again. The airplane then descended in a nose-down attitude, impacted the ground and spun around.

Another witness, a pilot, was approaching runway 09L for landing. As he turned onto the base leg for runway 09L, N9926Q lifted off the runway. The pilot-witness noticed the airplane was not climbing as it should and it appeared the flaps were extended. As he turned onto final approach for landing, he saw the airplane "lagging" and "wallowing in the air with flaps extended." As he flared for landing, he heard the pilot of N9926Q tell the control tower that he was a little overweight and needed to return. The witness then saw the airplane about 100 to 200 feet in the air over the threshold of runway 27R, and its wings were "shaky." The left wing dipped and the airplane descended, struck the ground with its left wing, and pivoted 180 degrees. When the airplane struck the ground, a big divot of dirt was thrown into the air. A fire ball erupted about 3 to 5 seconds after impact.

#### PERSONNEL INFORMATION

The pilot, age 19, enrolled in Western Michigan University's (WMU) FAA-approved 49 Code of Federal Regulations Part 141 flight school on August 28, 2012, flying the Cirrus SR20 exclusively. He received his private pilot certificate with an airplane single-engine land rating on May 2, 2013. He held a first class airman medical certificate, dated October 9, 2012, with the limitation that he must wear corrective lenses while exercising the privileges of his pilot certificate. He had recently been accepted as a midshipman at the United States Naval Academy. The accident occurred a little more than a month after he received his pilot's certificate.

The pilot's logbook was never located. According to the FAA and WMU training records, when the pilot took his private pilot practical test on May 2, 2013, he had logged 52.3 hours total time, of which 42.2 hours were dual instruction. The pilot had reportedly flown a Cessna 172 for a few hours when he was in Florida, but this report could not be substantiated.

#### AIRCRAFT INFORMATION

N9926Q, serial number 17265870, was manufactured by the Cessna Aircraft Corporation in 1976. It was powered by a Lycoming O-320-E2D engine, serial number L-40946-27A, rated at 150 horsepower, driving a McCauley 2-blade, all-metal, fixed pitch propeller (model DTM7553, serial number 728396).

According to the aircraft maintenance records, the last annual and 100-hour inspections were done on May 23, 2013, at a tachometer time of 3,467.3 hours. At that time, the airframe and engine had accrued 17,949.3 hours and 13,016.8 hours, respectively, and 2,352.8 hours had elapsed since the last engine major overhaul. At the accident site, the tachometer read 3,539.5 hours.

#### METEOROLOGICAL INFORMATION

The following weather observations were recorded by KPTK's Automated Surface Observing Station (ASOS) at 1321:

Wind, 130 degrees at 6 knots; visibility, 10 statute miles; sky condition, 9,000 feet scattered, ceiling, 15,000 feet broken, 25,000 feet overcast; temperature, 28 degrees Celsius (C.); dew point, 17 degrees C.; altimeter, 30.17 inches of mercury.

#### AERODROME INFORMATION

Oakland County International Airport (KPTK) is located in Waterford, Michigan, about 5 miles west of Pontiac, Michigan. It is situated at an elevation of 981 feet msl (mean sea level), and is served by 3 runways: 09R-27L, 09L-27R, and 18-36. At the time of the accident, N9926Q was taking off on runway 09L-27R (5,676 feet x 100 feet, asphalt, porous friction course overlay).

#### WRECKAGE AND IMPACT INFORMATION

N9926Q started its takeoff roll on runway 09L from intersection M (5,320 feet of runway available). The airplane impacted terrain slightly to the left and just past the departure end of the runway at a location of 42 degrees, 40.035' north latitude and 83 degrees, 24.742' west longitude.

The on-scene investigation revealed the airplane impacted terrain in a nose-low, left wing-low attitude.

There was a ground scar, measuring 7 feet long and 4 feet wide and aligned on a magnetic heading of 060 degrees, extending from the initial impact point to the wreckage. Upon impact, the airplane rotated approximately 180 degrees, coming to rest on a magnetic heading of 300 degrees. The cockpit area was consumed by post-impact fire. The airplane was equipped with seat belts and shoulder harnesses, but the webbing had been burned away.

The propeller blades bore chordwise and spanwise scratches on the camber surfaces. One blade had separated at mid-point. The separated piece was found in the impact crater, and was bent 90 degrees forward. The other blade bore a slight S-bend along its length.

The flap handle was burned away. The flap gage registered 0 degrees, but it had been burned and the needle was free to move. The wings flaps were full down. The flap actuator measured approximately 5.8 inches, which equated to flaps fully extended (40 degrees). The elevator trim tab measured between 0 and 5 degrees tab up.

After cleaning off the soot from the instrument glass, the airspeed indicator registered 0 KIAS (knots indicated airspeed), and the heading indicator was aligned with 245 degrees. The vertical speed indicator was unreadable. The altimeter read 2,660 feet, and the Kollsman window was set to 30.15 inches of mercury. The tachometer read 0 rpm and the recorder read 3,539.5 hours. The master switch was on, and the magnetos were on BOTH although the key was broken off. The fuel selector handle was separated from the fuel selector valve. The valve was not located. The emergency locator transmitter (ELT) activated on impact and was turned off by first responders. Control continuity was established.

There was no evidence of pre-impact airframe, power plant, or propeller malfunction or failure.

## MEDICAL AND PATHOLOGICAL INFORMATION

According to the autopsy report, the pilot's death was attributed to thermal injuries. Specks of soot were found in the trachea. The only significant injury found was a closed fracture of the left ankle.

The Oakland County toxicology report found less than 1% carboxyhemoglobin saturation. Toxicological screening performed by FAA's Civil Aerospace Medical Institute (CAMI) revealed no carbon monoxide in blood and no ethanol in vitreous. Cyanide tests were not performed. Urine analysis detected 33.8 (ug/ml, ug/g) salicylate (aspirin).

## TESTS AND RESEARCH

### Security Camera Footage

Two videos from airport security cameras were sent to NTSB's Vehicle Recorder Division. The airplane can be seen taking off from runway 09L, climbing to about 150 feet, and then descending to the ground in a left wing-low attitude. A plume of smoke appears shortly thereafter.

### Weight and Balance

Weight and balance calculations were performed by Cessna's technical representative, to wit:

Empty weight (dated July 15, 2005) 1,471.5 pounds  
 Occupants (from medical certificate and Michigan drivers licenses) 683  
 Estimated fuel on board \* 144  
 Estimated gross weight 2,298.5 pounds  
 Maximum allowable gross weight 2,300 pounds

\*The airplane had previously been fueled to capacity. Another renter-pilot flew the airplane for about two hours prior to the accident.

### Flaps

The majority of the pilot's flight experience was in the Cirrus SR20. Both the Cirrus SR20 and Cessna 172M wing flaps are electrically operated. The Cirrus wing flap switch is directly in front of the throttle control and has three position detents: UP (0 per cent), 50 per cent, and 100 per cent. Setting the switch to the desired position causes the flaps to extend or retract to the appropriate setting. An indicator light at each control switch position illuminates when the flaps reach the selected position. The UP (0 per cent) light is green and the 50 per cent and 100 per cent lights are yellow. The Cessna 172M employs a spring-loaded switch that must be held down or up until the desired flap setting is attained as indicated by the flap gage with markings at 0 degrees, 10 degrees, 20 degrees, 30 degrees, and 40 degrees.

The Western Michigan University Cirrus SR20 preflight checklist requires the pilot to begin his preflight inspection with the flaps set at 0. The pilot then places the flaps at 50 per cent and 100 per cent, checking for proper annunciator light illumination. The Cessna 172M preflight checklist in the Pilot's Operating Handbook does not require the extension of the flaps for preflight inspection. Cirrus SR20 takeoffs are normally made using 50 per cent flaps. Takeoffs in the Cessna 172M are normally made with the flaps up.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	19
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	October 9, 2012
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	May 2, 2013
<b>Flight Time:</b>	52 hours (Total, all aircraft), 2 hours (Total, this make and model), 8 hours (Pilot In Command, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N9926Q
<b>Model/Series:</b>	172M	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal; Utility	<b>Serial Number:</b>	17265870
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	May 23, 2013 100 hour	<b>Certified Max Gross Wt.:</b>	2300 lbs
<b>Time Since Last Inspection:</b>	72 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	17949 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	O-320-E2D
<b>Registered Owner:</b>	Flight 101, LLC	<b>Rated Power:</b>	150 Horsepower
<b>Operator:</b>	Flight 101, LLC	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KPTK, 981 ft msl	<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>	12:40 Local	<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Scattered / 9000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 15000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	6 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	130°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.17 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 17°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Waterford, MI (KPTK)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Waterford, MI (KPTK)	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	13:40 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Oakland County International KPTK	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	981 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	09L	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	5676 ft / 100 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	3 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	4 Fatal	<b>Latitude, Longitude:</b>	42.667221,-83.412223



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Scott, Arnold
<b>Additional Participating Persons:</b>	Douglas A Peterson; FAA Flight Standards District Office; Belleview, MI Henry J Soderlund; Cessna Aircraft Corporation; Wichita, KS
<b>Original Publish Date:</b>	February 10, 2014
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=87264">https://data.ntsb.gov/Docket?ProjectID=87264</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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