Aviation Investigation Final Report

Location:	Uvalde, Texas	**Accident Number:**	CEN19LA054
Date & Time:	January 12, 2019, 11:30 Local	**Registration:**	N813WT
Aircraft:	Canadair CL 600 2A12	**Aircraft Damage:**	Substantial
Defining Event:	Hard landing	**Injuries:**	9 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

The pilot, copilot, flight attendant, and six passengers departed on a corporate flight to a private airstrip. After leveling off at flight level 280, the flight crew checked the weather conditions at nearby airports. Based on the weather information that they had, the pilot planned for a visual approach to the runway.

As the airplane neared the destination, the pilot flew over the runway and entered a left downwind visual traffic pattern to check if any animals were on the runway and what the windsock on the airstrip indicated. The pilot stated that they did not see the windsock as they passed over the runway. The pilot reported that there were turbulence and wind gusts from the hills below and to the west.

When the airplane was over the runway about 50 ft above ground level (agl), the pilot reduced the engine power to idle. The pilot reported the airplane then encountered wind shear; the airspeed dropped rapidly, and the airplane was "forced down" to the runway. A representative at the airstrip reported that the airplane hit hard on landing. The pilot unlocked the thrust reversers, applied brakes, and reached to deploy the ground spoilers. As he deployed the thrust reversers, the pilot said it felt like the right landing gear collapsed. He applied full left rudder and aileron, but the airplane continued to veer to the right. The pilot tried using the tiller to steer to the left but got no response. The airplane left the side of the runway and went into the grass, which resulted in substantial damage; the right main landing gear was broken aft and collapsed under the right wing.

Postaccident examinations of the airplane revealed no preimpact mechanical malfunctions or failures that would have precluded normal operation.

A review of weather conditions showed surface winds out of the north to northwest at 15 kts, with some gusts up to 20 kts. There was potential for turbulence and wind shear below 5,000 ft, but there were no direct observations. The area forecast about 30 minutes after the accident called for northwesterly winds at 10 to 17 kts with a few higher gusts in the afternoon for the general area.

Data from an onboard enhanced ground proximity warning system (EGPWS) revealed that the crew received a terrain alert just before the airplane crossed the runway threshold. At the time the airplane was over the runway threshold, it was 48 ft agl and in a 1,391 ft per minute rate of descent. The airplane impacted the runway 3 seconds later.

Given the pilot's account, the weather information for the area, and the data from the airplane's EGPWS, it is likely that the airplane encountered wind shear while transitioning from approach to landing.

Probable Cause and Findings

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

The airplane's encounter with wind shear on short final approach to the runway, which resulted in a hard landing and fracture of the right main landing gear.

Findings

Environmental issues	Windshear - Contributed to outcome
Aircraft	Landing flare - Capability exceeded
Aircraft	Landing gear (fitting on wing) - Failure

Factual Information

History of Flight

Landing	Windshear or thunderstorm
Landing-flare/touchdown	Hard landing (Defining event)
Landing-flare/touchdown	Runway excursion

On January 12, 2019, about 1130 central standard time, a Canadair CL-600-2A12 airplane, N813WT, impacted terrain following a runway excursion at the Ox Ranch Airport (01TX), Uvalde, Texas. The pilot, copilot, flight attendant, and 6 passengers on board were not injured and the airplane sustained substantial damaged. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 corporate flight. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the cross-country flight that originated at the Fort Worth Meacham International Airport (FTW), Fort Worth, Texas, about 1030, and was destined for 01TX.

The flight was to take the 6 passengers to the Ox Ranch for a day of activities. The captain reported that they departed FTW, and proceeded southwest toward 01TX. The Houston Air Route Traffic Control Center (ARTCC) cleared the airplane to FL280. After leveling off at FL280, the flight crew checked the weather conditions at Uvalde (UVA) and Laughlin (DLF), Texas. UVA reported wind from 290° at 13 knots, with gusts up to 20 knots. DLF reported wind from 350° at 12 knots with gusts up to 18 knots. Based on the weather they had, the pilot planned for a visual approach to runway 35 at 01TX.

As the airplane arrived in the Uvalde area, ARTCC cleared the airplane to descend to 4,000 ft. After leveling off at 4,000 ft, the flight crew canceled their IFR clearance and proceeded to the airport visually. The pilot flew over the runway and entered a left downwind visual traffic pattern to see if there were any animals on the runway and what the windsock on the airport indicated. The pilot stated that they did not see the windsock as they passed over the runway. There were no animals on the runway, but the air was turbulent.

The flight crew called their downwind and base legs over the airport's common frequency. On base leg, the pilot had the copilot set the flaps to 30°. As the pilot turned the airplane onto the final approach for landing, the copilot lowered the landing gear. The airplane was 4.5 miles from the end of the runway at 2,500 ft agl and an airspeed of 170 kts. The copilot completed the "Before Landing" checklist. The pilot confirmed the thrust reversers were armed and called for the flaps to be set to 45°. At 2 miles from the end of the runway, the pilot checked his approach speed and confirmed the landing gear was down.

The pilot reported there was turbulence and wind gusts from the hills below and to the west of them. As they passed 50 ft. and coming over the runway, the pilot reduced engine power to idle. The pilot reported they then encountered a windshear. Their airspeed dropped rapidly and the airplane "was forced down" to the runway. The pilot unlocked the thrust reversers, applied brakes, and reached to deploy the ground spoilers. As he deployed the thrust reversers, the pilot said it felt like the right landing gear collapsed. He applied full nose-left rudder and left-wing-down aileron, but the airplane continued to veer to the right. The pilot tried using the tiller to steer to the left with no response. The airplane exited the

side of the runway and went into the grass.

A representative for the airport reported that the airplane on landing hit hard. About two-thirds of the way down runway 35, the airplane slid off the right side of the runway. The airplane proceeded through a ditch and struck a perimeter fence before coming to a stop.

Figure 1: Accident Scene

Pilot Information

Certificate:	Airline transport	**Age:**	42,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	May 22, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 22, 2018
Flight Time:	(Estimated) 9000 hours (Total, all aircraft), 3500 hours (Total, this make and model), 8000 hours (Pilot In Command, all aircraft), 55 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Commercial	**Age:**	31,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	May 10, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 8, 2018
Flight Time:	(Estimated) 1015 hours (Total, all aircraft), 25 hours (Total, this make and model), 500 hours (Pilot In Command, all aircraft), 70 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Canadair	**Registration:**	N813WT
Model/Series:	CL 600 2A12 601	**Aircraft Category:**	Airplane
Year of Manufacture:	1983	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3016
Landing Gear Type:	Retractable - Tricycle	**Seats:**	12
Date/Type of Last Inspection:	October 10, 2018 Annual	**Certified Max Gross Wt.:**	45100 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:	8408.2 Hrs as of last inspection	**Engine Manufacturer:**	General Electric
ELT:	C126 installed	**Engine Model/Series:**	CF-34-1A
Registered Owner:	Tw 601-C Investment Llc	**Rated Power:**	8729 Lbs thrust
Operator:	Tw 601-C Investment Llc	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	UVA,942 ft msl	**Distance from Accident Site:**	24 Nautical Miles
Observation Time:	11:55 Local	**Direction from Accident Site:**	135°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	17°C / 6°C
Precipitation and Obscuration:			
Departure Point:	Fort Worth, TX (FTW)	**Type of Flight Plan Filed:**	IFR
Destination:	Uvalde, TX (01TX)	**Type of Clearance:**	IFR
Departure Time:	10:30 Local	**Type of Airspace:**	Class G

A review of weather conditions in the Uvalde, Texas, area showed surface winds out of the north to northwest at 15 kts with some gusts up to 20 kts. There was potential for turbulence and wind shear below 5,000 ft, but there were no direct observations to confirm this.

The area forecast discussion issued by the National Weather Service for 1200, called for northwesterly winds at 10 to 17 kts with a few higher gusts in the afternoon for the Hill Country and Central Texas.

Airport Information

Airport:	Ox Ranch 01TX	**Runway Surface Type:**	Asphalt
Airport Elevation:	1293 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35	**IFR Approach:**	None
Runway Length/Width:	5800 ft / 70 ft	**VFR Approach/Landing:**	Straight-in

At the time of the accident, the runway surface conditions were dry. The airport is private use and requires prior permission to land. There are no automated weather reporting stations on or near the airport.

Wreckage and Impact Information

Crew Injuries:	3 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	6 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	9 None	**Latitude, Longitude:**	29.461389,-100.114166(est)

The airplane wreckage was in a field near a dirt service road on airport property, about 2,100 ft. east of runway 35. The airplane was upright and oriented on a 170° heading. Preceding the airplane were two sets of parallel skid marks in the dirt that began about 1,600 ft from the runway threshold and curved along the ground ending at the airplane. Also preceding the airplane was a three inch wide, 2 inch deep, and 1,500 ft long gouge in the runway asphalt that began 53 ft from the runway threshold and ran parallel to the right side of the runway to where it ended, the point where the airplane departed the right side of the runway.

The airplane was intact and rested on the right wing, left main landing gear, and the nose section beneath the flight deck. A portion of the airport perimeter fence was found embedded in the vertical fin leading to the vertical stabilizer. The right main landing gear was broken aft and collapsed under the right wing. It remained attached to the airplane at the main gear side strut retraction actuator. The right winglet and leading edge of the right wing showed impact damage along their spans. The trailing edge of the right wing and spar structure at the right main landing gear wheel well were bent and broken upward. The inboard portion of the right inboard flap was broken upward at the wing root. A black rubber mark corresponding to the tread of the right main landing gear outboard tire was found smeared on the underside of the broken inboard piece of the right inboard flap.

The nose landing gear was twisted sideways 90°, collapsed aft and upward, and pressed into the underside of the nose landing gear wheel well, right nose wheel well door, and the underside of the fuselage, left of the nose gear wheel well.

The pilot's number one windshield outer pane was shattered due to impact damage. There were

numerous scratches in the forward fuselage of the airplane that began at the nose and ran horizontally along the right side and top of the fuselage. The fin forward of the vertical stabilizer was broken aft. The leading edge of the vertical stabilizer was bent and broken aft at the fuselage. A length of metal mesh fencing was embedded at the base of the vertical fin and trailed toward the right side of the airplane.

Tests and Research

An audition of the cockpit voice recorder was conducted on April 1, 2019. The tape inside the recorder was found broken. No data regarding the accident flight was retrieved.

Examinations of the airplane revealed that the right wing landing gear trunnion fitting broke at the upper flange and web in the plane of the aft lug which resulted in the pintle pin disengagement from the aft and forward supporting lugs. Results from the failure examination of pieces of the right wing landing gear trunnion fitting were consistent with overload failure patterns resulting from a hard landing.

Data from the EGPWS from the accident flight revealed that the windshear alerting function was disabled. From the data it was determined that the takeoff was at 5644:14:15. The landing record was created 46 minutes and 49 seconds later at 5645:01:04. Five seconds earlier, at 5644:59:49, the unit put out a terrain awareness caution. Per the manufacturer, at 5645:01:04, the airplane was 50 ft agl over the runway threshold, and showed a calibrated airspeed of 123.6 kts, a groundspeed of 114 kts. and an altitude rate of -1,257 ft per minute. One second later, the altitude rate was -1,391, and a second after that it was 80 ft per minute. In that 3 second time period, the airplane's radar altitude went from 48 ft agl to 13.5 ft. agl.

Administrative Information

Investigator In Charge (IIC):	Bowling, David
Additional Participating Persons:	Lewis C Gonzales; Federal Aviation Administration; Addison, TX Beverley Harvey; Transportation Safety Board of Canada; Gatineau, Quebec Michael Lemay; Bombardier Aviation; Montreal, Quebec Raphael Rochette; Safran Landing Systems; Gloucester
Original Publish Date:	June 29, 2020
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=98838

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