SAFETY GRAM 4.0

June 2019

AIR FORCE SERVICES

AERO CLUB

FLIGHT TRAINING CENTER

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SAFETY GRAM

Jun 2019

Case:

Reference NTSB Aviation Accident Factual Report (3 Pages)

Questions (No right or wrong):

- What are environmental conditions that create turbulence?

- What is a downburst?

- What is the anatomy of a microburst?

- What are your aircraft's turbulence penetration procedures?

- What are your aircraft's go-around procedures?

- What is the difference between Vx and Vy?

Discussion:

Gusty winds and turbulence can make all phases of flight uncomfortable and in some cases dangerous. This is especially true during take-off and landing. Complicating matters is the fact that turbulence and wind shear are invisible making it difficult to plan around or avoid flying into/through such areas.

As pilots we can do a few things to reduce the risk of encountering turbulence and/or downburst events. Local knowledge is especially useful in knowing when and where to go or not go. If an airfield is new to you, recognize this as a risk factor and make more comprehensive preparations before departing. This should include reading all available notes and a call to the airfield manager. Analyzing the probability for turbulence, wind shear or downburst by looking at time of day, time of year, topography and current/forecast weather. Airfield analysis plus airfield knowledge should help reduce the risk of encountering dangerous turbulence.

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Finally, we should train to react appropriately when our careful planning comes into conflict with the reality of the world. When strong turbulence in encountered enroute consider slowing the aircraft to POM turbulence penetration speed and focus on keeping the aircraft attitude in the level, and upright, position while allowing deviations in airspeed and altitude. If turbulence is encountered on approach be ready to execute an immediate go-around. You will need to use your judgment on the best course of action because many variables are at play in this situation. If the aircraft is difficult to control due to the turbulence a divert is probably in order. If you experience a downburst on final it will usually come as a headwind followed by a tailwind. This yields a double wammy because you will experience an increase in airspeed and the tendency of the aircraft to climb as a result of the "performance increasing wind shear" causing you to reduce power and attempt to get back on glide path. At this time you will likely encounter the tail wind or "performance decreasing wind shear". Recovering from a severe downburst is difficult, even for high powered turbine aircraft. For this reason it's best to avoid conditions when downbursts are likely to occur, usually convective activity and thunderstorms.

If you are caught in a downdraft attempt to recognize the performance increasing shear and immediately execute a max effort go-around. If you end up in the performance decreasing shear side of the downburst immediately execute a max effort go-around. The theme here is to execute a max effort go-around which I define as a full power, maximum lift configuration for your aircraft (i.e. 10 degree flap), straight ahead, Vx climb until safely out of the downburst and away from the ground. During the maneuver ensure the aircraft is not taken to a stall, even if ground contact is imminent. If ground contact is not avoidable maintain the max effort go-around attitude and attempt to land in the most favorable location. Taking the aircraft to a stall at any phase of the maneuver "just to get a little more" will only make things worse.

This is a difficult scenario to be in. Hopefully we can train to avoid significant turbulence and downbursts. In the times we still end up in these conditions we should be prepared to react accordingly.

CONTINUE TO FLY SAFE!

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National Transportation Safety Board
Aviation Accident Data Summary

Location:	Boulder, CO	**Accident Number:**	CEN14CA123
Date & Time:	01/25/2014, 1600 MST	**Registration:**	N738LQ
Aircraft:	CESSNA 172N	**Injuries:**	3 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot flew a round robin cross-country flight to practice touch and go landings at nearby airports. At one airport, he aborted the landing due to "moderate to severe turbulence on final." During the approach to the destination airport, he aborted his first approach due to strong winds and turbulence and decided to go around. During his second approach, the airplane lost about 200 feet of altitude following a downdraft. The pilot applied full throttle to gain airspeed. A wind gust lifted the airplane's right wing and the pilot applied full right aileron. The airplane's left wing, the left main landing gear, and the nose landing gear impacted terrain where the airplane skidded for 100 to 150 feet and sustained substantial wing damage. Subsequent to the accident, the pilot became aware of the airport/facility directory remarks for turbulence associated with the selected runway. Additionally, he reported that the airplane did not have any mechanical malfunctions during the accident flight.

Flight Events

Approach-VFR pattern final - Turbulence encounter
Uncontrolled descent - Collision with terr/obj (non-CFIT)

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The pilot's failure to maintain airplane control during final approach with known turbulence present.

Findings

Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
Environmental issues-Conditions/weather/phenomena-Turbulence-Terrain induced turbulence-Contributed to outcome

Pilot Information

Certificate:	Private	**Age:**	34
Airplane Rating(s):	Single-engine Land	**Instrument Rating(s):**	None
Other Aircraft Rating(s):	None	**Instructor Rating(s):**	None
Flight Time:	(Estimated) 84 hours (Total, all aircraft), 22 hours (Total, this make and model), 80 hours (Pilot In Command, all aircraft), 7 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N738LQ
Model/Series:	172N N	**Engines:**	1 Reciprocating
Operator:	Journeys Aviation Inc.	**Engine Manufacturer:**	LYCOMING
Operating Certificate(s) Held:	None	**Engine Model/Series:**	O-320-H2AD
Flight Conducted Under:	Part 91: General Aviation - Personal		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	BDU, 5288 ft msl	**Weather Information Source:**	Weather Observation Facility
Lowest Ceiling:	None	**Wind Speed/Gusts, Direction:**	14 knots / 22 knots, 320°
Temperature:	15°C	**Visibility**	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LONGMONT, CO (LMO)	**Destination:**	Boulder, CO (BDU)

Airport Information

Airport:	BOULDER MUNI (BDU)	**Runway Surface Type:**	Asphalt
Runway Used:	26	**Runway Surface Condition:**	Dry
Runway Length/Width:	4100 ft / 75 ft		

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Latitude, Longitude:	40.039167, -105.216944 (est)		

Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	**Adopted Date:**	02/13/2014
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=88722		