# Aviation Investigation Final Report

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| **Location:** | Baldwin, Wisconsin | **Accident Number:** | CEN16LA288 |
| **Date & Time:** | July 21, 2016, 14:00 Local | **Registration:** | N7581F |
| **Aircraft:** | Cessna 208B | **Aircraft Damage:** | Substantial |
| **Defining Event:** | Runway excursion | **Injuries:** | 15 None |
| **Flight Conducted Under:** | Part 91: General aviation - Skydiving | | |

## Analysis

Before the accident flight, the commercial pilot had conducted three flights, during which parachutists were successfully dropped. After each flight, he returned the empty airplane to a dry grass airstrip (1,950 ft long) and conducted full-stop landings. Because the temperature was over 90° with high humidity, the pilot requested that his manifests allow only up to 14 parachutists and a longer time between shutdowns to ensure sufficient time for adequate engine cooling before the next flight. The pilot reported that pop-up rain showers had been passing north and south of his base airport throughout the morning but that they never came closer than 10 to 15 miles.

While preparing for the accident flight, the pilot noted that clouds were over the intended drop zone but that there was no rain and that the clouds were moving away from the northern edge of the drop zone, so the pilot decided that it was worth attempting the flight. While climbing through 4,000 ft, an air traffic controller advised the pilot that light-to-moderate precipitation was in the area. The pilot continued to climb toward the drop zone, and the flight encountered light rain. The pilot advised the 14 parachutists that they were returning to land because of the weather.

The approach was a stabilized, power-on approach, which was much flatter than the previous approaches with an empty airplane. The pilot used flaps incrementally to 30° (full flaps), initiated a flare over the threshold, and touched down at 65 knots. He used full-reverse propeller and retracted the flaps during the landing roll. When the pilot started to apply the brakes, he discovered that the braking action was null. The grass runway was wet because of a recent rain shower. Because of the hot temperature, humidity, full load of parachutists, and trees at the end of the runway, the pilot decided not to attempt a go-around. The pilot held full aft on the control yoke for aerodynamic braking, stayed in full-reverse propeller, and braked as much as possible without locking the wheels up. Just before coming to a complete stop (about 5 to 10 mph), the airplane rolled into a ditch before a road beyond the departure end of the runway, which resulted in substantial damage to the empennage.

According to the airplane manufacturer, the applicable Pilot's Operating Handbook (POH) tables did not provide distances for landing on wet grass runways. However, for landing on dry grass runways, 40% distance was added to the normal landing roll distance chart figures. The pilot reported that the airplane weighed 8,010 lbs, and the nearest weather reporting station to the accident site, located at an airport about 16 miles to the north, reported that the temperature was 30°C at the time of the accident. According to the POH chart, the minimum required landing distance would have been about 2,265 ft. The published length of the runway was 1,950 ft.

The closest airport had an available runway that was 5,507 ft long, which would have been well within the safe stopping distance for the fully loaded airplane. The pilot's decision to land the fully loaded airplane on the wet grass runway that had insufficient length for the landing led to the runway overrun. If he had chosen to land at the nearby airport that had sufficient length for the landing, the accident may have been avoided.

## Probable Cause and Findings

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

The pilot's decision to land the fully loaded parachutist drop airplane on a wet grass runway that had insufficient length for the landing in high temperature conditions, which resulted in a runway overrun, when a more suitable longer runway was available at a nearby airport.

### Findings

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| **Personnel issues** | Decision making/judgment - Pilot |
| **Aircraft** | Landing distance - Capability exceeded |
| **Environmental issues** | High temperature - Effect on equipment |
| **Environmental issues** | Wet surface - Effect on operation |

# Factual Information

## History of Flight

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| **Landing-landing roll** | Runway excursion (Defining event) |

On July 21, 2016, about 1400 central standard time, a Cessna 208B air drop configured airplane, N7581F, registered to Desert Sand Aircraft Leasing Company, Inc., of Carson City, Nevada, sustained substantial damage during a runway excursion after landing on runway 18 at the Baldwin Airport (WI14), Baldwin, Wisconsin. The commercial pilot and 14 passengers were not injured. The air drop flight was being operated by Skydive Twin Cities, of Baldwin, Wisconsin, and conducted under the provisions of Federal Code of Regulations Part 91. No flight plan was filed and local traffic advisory was requested by the pilot. Visual meteorological conditions with light rain showers prevailed throughout the area. The flight originated from WI14 about 1350.

According to the pilot, he had ferried the airplane from Forest Lake, Wisconsin, to WI14 on the morning of the accident. The airplane had just completed its 100-hour inspection at Forest Lake. After flying three air drops without incident, he prepared for his fourth flight of the day. He stated that all the previous 3 flights had successfully deployed the parachutists and were full stop landings in an empty airplane. Due to the temperatures of 90+ degrees and high humidity, the pilot requested his manifests limit to 14 parachutists and allow a longer time between shutdowns to allow for adequate cooling before the next flight.

The pilot reported that pop-up rain showers had been passing north and south of Baldwin throughout the morning, but never coming closer than 10-15 miles. While preparing for the fourth flight of the day (accident flight) the pilot discussed the weather with an experienced parachutist. Clouds were currently over the intended drop zone but there was no rain and the clouds were moving away from the northern edge of the drop zone. The pilot and parachutist agreed that it was worth attempting the drop considering the cloud movement away from the drop zone. The 14 parachutists were loaded and the airplane took off. Climbing through 3,000 feet MSL, the pilot checked in with ATC for traffic advisory and a radio check. Climbing through 4,000 feet, ATC advised the pilot that light to moderate precipitation was in the area. The pilot continued to climb toward the drop zone to see if there was any rain over the area and about 1-1.5 miles from the zone, light rain was encountered. The pilot advised the parachutists that they were returning to Baldwin to land because of the weather.

After descending, the pilot set up a base leg to runway 18, and about two miles from the airport, turned on final. The approach was a stabilized, powered-on approach which was much flatter than the standard descent with an empty airplane. The pilot used flaps incrementally to 30-degrees (full flaps), initiated a flare over the threshold, and touched down at 65 knots. Full reverse propeller was used and the flaps retracted during the landing rollout. When the pilot started to apply brakes, he discovered that the braking action was null. The 1,950-foot-long grass runway was wet because of a recent rain shower. Because of the elevated temperature, humidity, full load, and trees at the end of the runway, the pilot decided to not attempt a go around. The pilot held full aft on the control yoke for aerodynamic braking,

stayed in full propeller reverse, and braked as much as possible without locking the wheels up. Just before coming to a complete stop (about 5-10 mph), the airplane rolled into a ditch before a road beyond the departure end of the runway, resulting in substantial damage to the empennage. The pilot secured the engine and all the occupants exited the airplane.

According to Cessna, the applicable 208B Pilot Operating Handbook (POH) tables do not provide for landing on WET grass runways. However, for landing on DRY grass runways, 40% distance is added to the normal landing roll distance chart figures. On NTSB Form 6120, the pilot reported an aircraft weight 8,010 pounds at the time of the accident. The nearest weather reporting station to the accident site, located about 16 miles to the north, reported the temperature at 30 degrees C. According to the POH chart, with an estimated airplane weight of 8,010 pounds, and temperature of 30 degrees C, the minimum landing distance would have been about 2,265 feet. The published length of runway 18 at the Baldwin Airport was 1,950 feet.

New Richmond Municipal Airport (RNH) was located about 16 miles to the north of Baldwin Airport. The length of runway 14 at RNH was 5,507 feet.

In an interview and email correspondence with the owner/operator (Skydive Twin Cities), he stated that the company's SOP would be updated to include the following language: *If landing on a grass runway shorter than 3000' while fully loaded, the aircraft should be taken to the nearest airport that meets or exceeds safe landing requirements.* He also stated that they also discussed the accident with their contract pilots and gave them a reminder of their training to use their best judgement in situations like what happened in Baldwin, Wisconsin. They discussed *avoiding* flying in situations where weather may become an issue and erring on the side of caution in all situations.

Skydive Twin Cities had 17 pilots, most of whom were contractors and used seasonally. The company fleet was comprised of 4 Cessna Grand Caravans, 1 Short Body 114A Cessna Caravan, 1 King Air 90, and 1 SC7 Skyvan.

## Pilot Information

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| **Certificate:** | Commercial | **Age:** | 36,Male |
| **Airplane Rating(s):** | Single-engine land; Multi-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | 4-point |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 1 Without waivers/limitations | **Last FAA Medical Exam:** | June 17, 2016 |
| **Occupational Pilot:** | Yes | **Last Flight Review or Equivalent:** | June 15, 2015 |
| **Flight Time:** | (Estimated) 1012 hours (Total, all aircraft), 301 hours (Total, this make and model), 2 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Cessna | **Registration:** | N7581F |
| **Model/Series:** | 208B B | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | 1994 | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 208B0389 |
| **Landing Gear Type:** | Tricycle | **Seats:** | 19 |
| **Date/Type of Last Inspection:** | July 20, 2016 100 hour | **Certified Max Gross Wt.:** | 9062 lbs |
| **Time Since Last Inspection:** | 1 Hrs | **Engines:** | 1 Turbo prop |
| **Airframe Total Time:** | 10660 Hrs at time of accident | **Engine Manufacturer:** | Honeywell |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | TPE331 |
| **Registered Owner:** | DESERT SAND AIRCRAFT LEASING CO INC | **Rated Power:** | 650 Horsepower |
| **Operator:** | Sky Dive Twin Cities | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | RNH | **Distance from Accident Site:** | 16 Nautical Miles |
| **Observation Time:** | 13:55 Local | **Direction from Accident Site:** | 360° |
| **Lowest Cloud Condition:** | Clear | **Visibility** | 10 miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 5 knots / None | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 280° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 29.95 inches Hg | **Temperature/Dew Point:** | 30°C / 22°C |
| **Precipitation and Obscuration:** | | | |
| **Departure Point:** | Baldwin, WI (WI14) | **Type of Flight Plan Filed:** | None |
| **Destination:** | Baldwin, WI (WI14) | **Type of Clearance:** | None |
| **Departure Time:** | 13:30 Local | **Type of Airspace:** | Class E |

## Airport Information

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| **Airport:** | Baldwin Airport WI14 | **Runway Surface Type:** | Grass/turf |
| **Airport Elevation:** | 1104 ft msl | **Runway Surface Condition:** | Wet |
| **Runway Used:** | 18 | **IFR Approach:** | None |
| **Runway Length/Width:** | 1950 ft / 120 ft | **VFR Approach/Landing:** | Full stop;Straight-in |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 None | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 14 None | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 15 None | **Latitude, Longitude:** | 44.966388,-92.387496(est) |

## Administrative Information

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| **Investigator In Charge (IIC):** | Lemishko, Alexander |
| **Additional Participating Persons:** | Samuel Shafer; FAA FSDO MSP; Minneapolis, MN |
| **Original Publish Date:** | September 6, 2017 |
| **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=93696 |