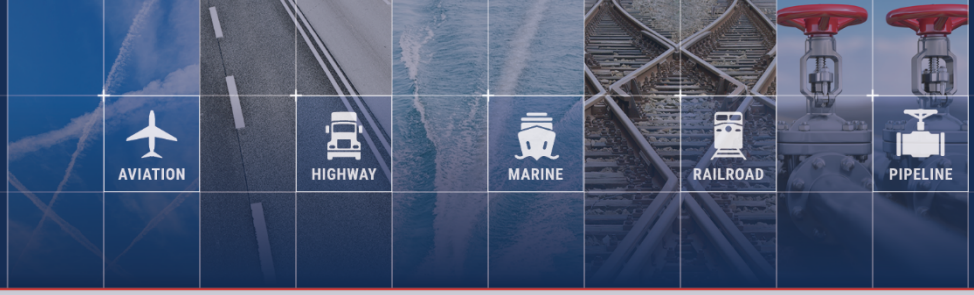

Aviation Investigation Final Report

Location:	Emmett, Idaho	**Accident Number:**	SEA04LA021
Date & Time:	November 23, 2003, 13:00 Local	**Registration:**	N8982C
Aircraft:	Piper PA-22-135	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The 118 hour pilot had less than 16 hours in the make/model, and the aircraft was equipped with a closed hydraulic brake system which was temperature sensitive. The pilot departed on a local flight, flew two touch and go landings and then climbed out to a higher (cooler) altitude before returning to the airfield for a full stop landing. During the landing roll the pilot was unable to achieve braking and the aircraft rolled off the upwind end of the runway, down an embankment and into a ditch. A significant drop in temperature had taken place over the previous several days to the flight and, according to a pilot/mechanic with 40 years of experience in the make/model, the aircraft's braking system would become ineffective if the system had less than optimal amount of hydraulic fluid and was then subjected to a significant cold soaking. Post-crash examination of the brakes by an FAA inspector revealed no mechanical malfunction, however the examination was conducted in a heated hangar.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Brake failure as a result of inadequate hydraulic (brake) fluid in the aircraft's closed brake system. Contributing factors were the pilot's overall lack of experience in the aircraft make/model, the cold soaked brake system due to the low temperatures, and the embankment and ditch.

Findings

Occurrence #1: OVERRUN
Phase of Operation: LANDING - ROLL

Findings
1. (C) FLUID,HYDRAULIC - INADEQUATE
2. (C) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - NOT PERFORMED
3. (F) LACK OF TOTAL EXPERIENCE IN TYPE OF AIRCRAFT - PILOT IN COMMAND
4. LANDING GEAR,NORMAL BRAKE SYSTEM - LOW PRESSURE
5. (F) WEATHER CONDITION - TEMPERATURE,LOW

Occurrence #2: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: LANDING - ROLL

Findings
6. (F) TERRAIN CONDITION - DROP-OFF/DESCENDING EMBANKMENT
7. (F) TERRAIN CONDITION - DITCH

Factual Information

On November 23, 2003, approximately 1300 mountain standard time, a Piper tricycle geared PA-22-135, N8982C, registered to multiple owners, and being operated/flown by a private pilot, sustained substantial damage during an overrun on landing at the Emmett Municipal airport, Emmett, Idaho. Neither the pilot nor passenger was injured. Visual meteorological conditions existed and no flight plan had been filed. The flight, which was personal, was operated under 14CFR91, and had originated from the Emmett airport approximately 45 minutes earlier.

The pilot reported that prior to departing Emmett at the beginning of the flight he conducted an engine run up holding the hand brake. He then departed, remaining in the pattern and executed two touch and go landings to runway 28, and did not use brakes during these landings. The pilot left the pattern for a short time operating at a higher altitude, and then returning and setting up for a landing on runway 28.

The aircraft touched down approximately 50 miles per hour and as the airspeed bled off the pilot applied the hand brake. He stated that "...I immediately realized there were no brakes. At that point I pumped the hand brake several times in hopes of building up some pressure. This did not work..." and "...I continued to hold the brake handle all the way back in the stopping position. I did not feel any resistance...." The passenger reported that he "...observed the pilot apply and recycle the brakes at least twice without noticeable braking or effect...."

The pilot maintained the aircraft on the centerline and rolled out straight ahead exiting the upwind end of the runway about 10 miles per hour. The aircraft then rolled down a gravel embankment and into a ditch.

Runway 28 at the Emmett airport is 3,250 feet in length and 50 feet in width. The runway surface is composed of asphalt and the first taxiway turnoff is approximately 2,450 feet short of the upwind end of the runway.

Following the accident an inspector assigned to the Federal Aviation Administration's Boise Flight Standards District Office physically tested the aircraft's brakes following its return to a hangar at the Emmett airport, and reported that they appeared to function (refer to Attachments FAA-I and OH-I). The testing was accomplished in a heated hangar, which the aircraft had been moved to earlier, and the testing was completed under circumstances of low loading/energy, i.e., the wing was merely lifted off the deck, the wheel spun by hand and the brake applied.

A local mechanic/pilot who has owned a Piper PA-22 for 40 years at the Emmett airport, was interviewed and reported that the PA-22's brake system is a closed hydraulic system operated by a hand brake (refer to Attachment OH-1). He indicated that this system is highly sensitive

to temperature changes and that when the system is fully serviced under cool conditions and then allowed to increase in temperature (e.g., a raise in ambient temperature) the system will lock up requiring that a small amount of fluid be bled out in order to release the brakes.

Conversely, when the system is under serviced and taken from a warm ambient temperature to a cold temperature the fluid contracts and the brakes become loose requiring the addition of brake fluid. The mechanic/pilot indicated this was a peculiarity of the PA-22 braking system which pilots new to the aircraft were often unfamiliar with.

The pilot reported a total of 118 hours of flight experience of which 15.7 hours were in the PA-22.

The surface temperature for Caldwell Industrial airport, which bears 183 degrees magnetic and 13 nautical miles from Emmet, was charted for 1255 local time for the 7 days from and previous to the date of the accident. The temperature trend showed a significant decreasing trend in temperature throughout the week (refer to Table I).

Pilot Information

Certificate:	Private	**Age:**	47,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	March 19, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	November 7, 2001
Flight Time:	118 hours (Total, all aircraft), 16 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8982C
Model/Series:	PA-22-135	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	22-1565
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 3, 2003 Annual	**Certified Max Gross Wt.:**	1950 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3048 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-290-D2
Registered Owner:	Graviet, L.	**Rated Power:**	135 Horsepower
Operator:	Mednicoff, Steve J.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	EUL,2432 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	12:55 Local	**Direction from Accident Site:**	183°
Lowest Cloud Condition:	Few / 4000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.37 inches Hg	**Temperature/Dew Point:**	2°C / -8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Emmett, ID (S78)	**Type of Flight Plan Filed:**	None
Destination:	(S78)	**Type of Clearance:**	None
Departure Time:	12:15 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Emmett Municipal S78	**Runway Surface Type:**	Asphalt
Airport Elevation:	2350 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	28	**IFR Approach:**	None
Runway Length/Width:	3250 ft / 50 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	43.854167,-116.544441

Administrative Information

Investigator In Charge (IIC):	McCreary, Steven
Additional Participating Persons:	Brent A Morrow; Boise FSDO; Boise, ID
Original Publish Date:	June 30, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58375