National Transportation Safety Board
Aviation Accident Final Report

Location:	PINE CITY, MN	**Accident Number:**	CHI00LA103
Date & Time:	04/02/2000, 1600 CDT	**Registration:**	N54454
Aircraft:	Piper PA-28-140	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor, 1 None
Flight Conducted Under:	Part 91: General Aviation - Aerial Observation		

Analysis

The airplane encountered an in-flight loss of engine power and sustained substantial damage on impact with a fence and vegetation during a forced landing in a field. The pilot had minor injury. The passenger was uninjured. The engine's number four cylinder's exhaust valve spring and valve were found failed. The valve spring had a 45-degree fracture approximately 0.75 inches from an end. The valve head was found with approximately a third of its' face fractured off. A section of valve head was found within the cylinder. The valve head's face and head section had indentations. The pilot stated, 'With the lake to our west, a bunch of trees to our north, a house to our south behind us, when the engine quit. I chose to turn 90[degrees] to the east fly under some high tension wires, which I knew I could do safely, to a field on the other side. The field was not very wide, but I felt it was safer for landing without any houses close by. Being 200 to 300 feet above the ground I didn't have the altitude to turn 180[degrees] and land in the field below. I could not get stopped in the narrow field, so consequently we went through the barb wire fence on the east side and hit a clump of bushes with our left wing, which brought us to a stop.'

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power due to the failure of the number four cylinder's exhaust valve spring and exhaust valve. Contributing to the accident were, the barbwire fence and the clump of high vegetation encountered by the airplane.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CRUISE

Findings
1. (F) ENGINE ASSEMBLY,OTHER - FAILURE
2. (F) ENGINE ASSEMBLY,VALVE,EXHAUST - FAILURE

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (C) TERRAIN CONDITION - NONE SUITABLE
4. EMERGENCY PROCEDURE - PERFORMED - PILOT IN COMMAND

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: EMERGENCY LANDING

Findings
5. (F) OBJECT - FENCE

Occurrence #4: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
6. (F) TERRAIN CONDITION - HIGH VEGETATION

Factual Information

On April 2, 2000, at 1600 central daylight time, a Piper PA-28-140, N54454, piloted by a commercial pilot, sustained substantial damage on impact with a fence and vegetation during a forced landing in a field near Pine City, Minnesota following an in-flight loss of engine power. The aerial observation flight was operating under 14 CFR Part 91. Visual meteorological conditions prevailed at the time of the accident. The flight was not operating on a flight plan. The pilot sustained minor injury and the passenger was uninjured. The local flight originated from Mora Municipal Airport, near Mora, Minnesota at 1430.

The pilot stated, "We flew for about 1 1/2 hours with no problems. Suddenly our engine loss power as I rolled out of a 360[degree] turn, at a check point about 5 mi east of Pine City. I immediately gave full power, mixture rich and carb heat on. Our power loss was so dramatic that I knew it wasn't carb ice. Our power dropped from 2400 rpm to 1500. We were at 2500' MSL and losing altitude. Between us and the airport was a lake which I felt wasn't safe to try and cross. I tried to fly north around the lake when the plane started to lose more power and it was evident we were going to have to ditch." He said, "With the lake to our west, a bunch of trees to our north, a house to our south behind us, when the engine quit. I chose to turn 90[degrees] to the east fly under some high tension wires, which I knew I could do safely, to a field on the other side. The field was not very wide, but I felt it was safer for landing without any houses close by. Being 200 to 300 feet above the ground I didn't have the altitude to turn 180[degrees] and land in the field below. I could not get stopped in the narrow field, so consequently we went through the barb wire fence on the east side and hit a clump of bushes with our left wing, which brought us to a stop."

The accident airplane's engine was salvaged and was disassembled. Its number four cylinder's exhaust valve spring and valve were found failed. The spring's uncompressed length from end to end as recovered was 2.25 inches. The spring was fractured approximately 0.75 inches from an end. The springs fracture surface was approximately 45 degrees to the longitudinal axis of the coil at that point. The valve head was found with approximately a third of its face fractured off. A semicircular section of the valve head, approximately 0.75 inches in length, was found within the cylinder. The valve head's face and valve head section were found with indentations. See appended valve photographs.

Pilot Information

Certificate:	Commercial	**Age:**	28, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	08/26/1999
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	875 hours (Total, all aircraft), 30 hours (Total, this make and model), 802 hours (Pilot In Command, all aircraft), 131 hours (Last 90 days, all aircraft), 92 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N54454
Model/Series:	PA-28-140 PA-28-140	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	28-7425135
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	03/11/2000, 100 Hour	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:	8 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	3350 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-E3D
Registered Owner:	HORIZON AVIATION INC.	**Rated Power:**	150 hp
Operator:	HORIZON AVIATION INC.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	JMR, 1012 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	1615 CDT	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 4200 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	11°C / 3°C
Precipitation and Obscuration:			
Departure Point:	MORA, MN (JMR)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1430 CDT	**Type of Airspace:**	Class G

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	EDWARD F MALINOWSKI	**Report Date:**	04/19/2001
Additional Participating Persons:	GLENN BLOOMQUIST; MINNEAPOLIS, MN		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		