Aviation Investigation Final Report

Location:	Manhattan, Kansas	**Accident Number:**	CEN24LA031
Date & Time:	October 21, 2023, 08:28 Local	**Registration:**	N52631
Aircraft:	Powrachute Pegasus	**Aircraft Damage:**	Substantial
Defining Event:	Miscellaneous/other	**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Before departing on the local area flight in the experimental powered parachute, the pilot installed a large heavy-duty deer feed bag that partially covered the radiator. He was concerned that the experimental engine would run “too cold” during the flight unless the radiator was partially covered.The powered parachute was flying about 400 ft above ground level when the pilot noticed that the engine overheat light illuminated. The pilot decided to continue flying. Shortly after, the engine sustained a total loss of engine power. The pilot performed a forced landing to a road and the powered parachute came to rest upright on a grass embankment near the road. The powered parachute sustained substantial damage to the fuselage and engine mount.

Postaccident examination revealed no mechanical anomalies with the engine. The large heavy-duty deer feed bag was found covering about 3/4 of the radiator surface area and was secured with two bungee cords. According to the airframe and engine manufacturers, neither company has published any guidance on covering up the radiator for flight operations.

The large heavy-duty deer feed bag obstructed the radiator inlet and restricted its designed cooling capability. The engine then did not have a source of adequate cooling, which likely resulted in the engine overheating and a total loss of engine power. The pilot noticed the engine overheat light was illuminated and continued with normal flight operations when guidance from the engine manufacturer states to perform a precautionary landing.

Probable Cause and Findings

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

The pilot’s improper modification of the engine cooling system that resulted in an engine overheat and total loss of power. Contributing to the accident was the pilot’s decision to continue the flight after the engine overheat light illuminated instead of performing a precautionary landing.

Findings

Personnel issues	Unnecessary action - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	(general) - Failure
Aircraft	Recip eng liquid cooling - Incorrect use/operation

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Maneuvering-low-alt flying	Miscellaneous/other (Defining event)
Emergency descent	Off-field or emergency landing

On October 21, 2023, about 0828 central daylight time, a Powrachute LLC Pegasus powered parachute, N52631, sustained substantial damage when it was involved in an accident near Manhattan, Kansas. The pilot and passenger sustained serious injuries. The powered parachute was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that, before departure from his farm field, he installed a large heavy-duty deer feed bag that partially covered the radiator because he was concerned that the experimental engine would run "too cold" during the flight unless the radiator was partially covered. The radiator, located above the engine, sits aft and above the rear seat. The pilot reported that he departed on the local area flight with a full tank of fuel.

The experimental powered parachute was flying about 400 ft above ground level when the pilot noticed that the engine overheat light illuminated. The pilot decided to continue flying. Shortly after, the engine sustained a total loss of engine power. The pilot performed a forced landing to a road and the powered parachute came to rest upright on a grass embankment near the road. The powered parachute sustained substantial damage to the fuselage and the engine mount.

The postaccident examination revealed that the intact fuel tank was about 7/8 full of fuel with no fuel leaks observed on the airframe. Coolant was drained from the radiator, and the coolant appeared to be in a normal condition. The large heavy-duty deer feed bag was found covering about 3/4 of the radiator surface area and was secured with two bungee cords. The engine was rotated, internal engine continuity was confirmed, and engine compression was noted to meet minimum specifications.

According to the airframe and engine manufacturers, neither company has published any guidance on covering up the radiator for flight operations. According to the Rotax Aircraft Engines 582 UL Operator's Manual, if an abnormal engine temperature is observed while in flight, "reduce engine power setting to the minimum necessary and carry out a precautionary landing."

The Federal Aviation Administration Powered Parachute Flying Handbook FAA-H-8083-29 discusses radiators and states in part:

Liquid-cooled engines can overheat for a number of reasons, such as coolant not at proper levels, a leak, a failed water pump, or a blockage of the radiator. Operating an engine above its maximum design temperature can cause a loss of power and detonation. It will also lead to serious permanent damage, such as scoring the cylinder walls and damaging the pistons and rings. Monitor the engine temperature instruments to avoid high operating temperature.

Operating the engine lower than its designed temperature range can cause piston seizure and scarring on the cylinder walls. This happens most often in liquid-cooled powered parachutes in cold weather where large radiators designed for summer flying may need to be partially blocked off.

Pilot Information

Certificate:	Sport Pilot	**Age:**	70,Male
Airplane Rating(s):	None	**Seat Occupied:**	Front
Other Aircraft Rating(s):	Powered-lift	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 21, 2023
Flight Time:	(Estimated) 165 hours (Total, all aircraft), 165 hours (Total, this make and model), 165 hours (Pilot In Command, all aircraft), 8 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Powrachute	**Registration:**	N52631
Model/Series:	Pegasus Undesignated Series	**Aircraft Category:**	Powered parachute
Year of Manufacture:	2006	**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	A181PEG
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	June 8, 2023 Condition	**Certified Max Gross Wt.:**	1100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	228 Hrs at time of accident	**Engine Manufacturer:**	Rotax Aircraft Engines
ELT:	Not installed	**Engine Model/Series:**	582 UL
Registered Owner:	On file	**Rated Power:**	64 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None
Operator Does Business As:	On file	**Operator Designator Code:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KMHK,1048 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	07:52 Local	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	6°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manhattan , KS (None)	**Type of Flight Plan Filed:**	None
Destination:	Manhattan , KS (None)	**Type of Clearance:**	None
Departure Time:	08:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	39.246181,-96.594065(est)

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Richard Terrell; FAA Wichita FSDO; Wichita, KS Bernhard Kobylik (Accredited Representative); Austrian Federal Safety Investigation Authority; Vienna, OF Jordan Paskevich (Technical Advisor); Rotax Aircraft Engines; Gunskirchen, OF
Original Publish Date:	May 30, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=193345