National Transportation Safety Board
Aviation Accident Final Report

Location:	PERKASIE, PA	**Accident Number:**	NYC97LA166
Date & Time:	08/17/1997, 1820 EDT	**Registration:**	N1224S
Aircraft:	Cessna 425	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor, 7 None
Flight Conducted Under:	Part 91: General Aviation - Executive/Corporate		

Analysis

During preflight, the pilot noticed a discrepancy between his requested fuel load and what the fuel gauges indicated. He decided the right fuel quantity gauge was accurate and the left fuel quantity gauge was inaccurate, and started a multiple leg flight. Based on the right fuel gauge indication at an away airport, the pilot elected to not refuel prior to starting his return flight. About 50 miles from the destination, the left and right low fuel quantity lights illuminated, and the right fuel gauge indicated 390 pounds of fuel onboard. The pilot elected to continue to his destination. A few minutes later, both engines lost power. A forced landing was made in an open school field. Before coming to rest, the left wing struck a football training device, and the outboard 4 feet of the wing was separated from the airplane. Postaccident investigation revealed, both fuel tanks, collector tanks, fuel lines, and filters were empty. When electric power was applied, the left fuel gauge indicated '0' and the right fuel gauge indicated 290 pounds of fuel remaining. The pilot reported that he should have monitored his fuel supply closer and landed at the first sign of any inconsistencies in fuel quantity readings.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's inadequate preflight, by failing to verify the fuel supply, which led to subsequent fuel exhaustion and loss of engine power. A related factor was: the inaccurate fuel quantity gauge.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: DESCENT - NORMAL

Findings
1. ALL ENGINES
2. (C) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (C) FUEL SUPPLY - NOT VERIFIED - PILOT IN COMMAND
4. (F) ENGINE INSTRUMENTS,FUEL QUANTITY GAGE - INCORRECT
5. (C) FLUID,FUEL - EXHAUSTION

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

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

Findings
6. OBJECT - OTHER

Factual Information

On August 17, 1997, about 1820 eastern daylight time, a Cessna 425, N1224S, operated by the Inductotherm Corp. Rancocus, New Jersey, was substantially damaged during a forced landing in Perkasie, Pennsylvania. The certificated commercial pilot was not injured. Six passengers were not injured, and one passenger received minor injuries. Visual meteorological conditions prevailed for the corporate flight which departed Niagara Falls, New York, about 1725, destined for Rancocus, New Jersey. The flight was operated on an Instrument Flight Rules (IFR) flight plan, and conducted under 14 CFR Part 91.

The pilot reported that he requested the airplane to be fueled to a total of 700 pounds per side prior to his departure from Niagara Falls, New York. When he preflighted the airplane, he noticed the fuel gauge for the right side indicated 1,060 pounds, and the fuel gauge for the left side indicated 700 pounds. The pilot stated, "...I knew this gauge [left] to be unreliable and felt positive that the 1,060 pounds showing on the right gauge was an accurate number. At this point I decided to rely on the right gauge for the entire trip...."

The pilot reported that upon arrival at Elmira, the right gauge showed 810 pounds, and upon arrival at Niagara Falls, New York, the right gauge indicated 650 pounds. Based upon the right gauge indication, the pilot cancelled his requested refueling for a total of 100 gallons (680 pounds) that had been ordered for his arrival at Niagara Falls.

The pilot departed Niagara Falls, for Rancocus, with the right fuel tank indicating 650 pounds of fuel remaining. At the top of climb, the right fuel gauge indicated 450 pounds of fuel remaining. In the vicinity of Allentown, Pennsylvania, while in a descent, both low fuel quantity lights illuminated. At that point, the right fuel gauge indicated 390 pounds of fuel remaining. The pilot elected to continue toward his destination, about 50 miles away. The airplane was descended to 9,000 feet. Then after initiating a descent to 3,000 feet, the right engine lost power. About 10 seconds later, the left engine lost power.

The pilot attempted to reach the Pennridge Airport, Perkasie. Unable to reach the Pennridge Airport, the pilot performed a forced landing in an open field, about 1 mile south of the airport, with the landing gear extended. During the touchdown and initial ground roll, all landing gear collapsed, with the left main gear striking the fuselage as it separated from the airplane. The left wing struck a football training device in the field and the outboard 4 feet of the wing was separated from the airplane.

The airplane was examined by an inspector from the Federal Aviation Administration (FAA), who reported that both wing tanks were empty, and there was no evidence of fuel siphoning or a ground fuel spill. In addition, no fuel was found in the collector tanks, fuel filters, or fuel lines to the engines. When electrical power was applied to the airplane, the left wing fuel gauge indicated zero fuel remaining, and the right wing fuel gauge indicated 290 pounds of fuel remaining.

According to maintenance records, the following fuel quantity discrepancies were found:

January 20, 1997 - fuel system calibrated, right fuel quantity signal conditioner replaced.

June 23, 1997 - Incoming discrepancy left fuel quantity indicator, replaced signal conditioner, recalibrated left fuel quantity indicating system.

August 6, 1997 - Left fuel quantity indicator intermittent - could not be duplicated, aircraft

taxied for departure and then taxied back in - bent cannon plug pin found, system checked satisfactory, airplane released.

At the time of the accident, the airplane had been operated for 2 hours and 28 minutes, with 3 takeoffs since the last refueling.

The investigation revealed that each wing was configured as a fuel tank, and in addition, a collector tank was located behind each engine, in the nacelle faring. The engines were fed from the collector tanks. The collector tanks were fed from the wing fuel tanks. The wing fuel tank quantity was measured by sensors in the wing tanks, and displayed on fuel gauges in the cockpit. The low fuel quantity sensors were also in the wing tanks. The collector tank did not have fuel gauges, but could be visually checked during preflight.

According to the Cessna Pilot's Operating Handbook, illumination of the low fuel quantity lights indicated that the fuel level had reached 160 pounds on the side indicated. The measurement system was independent of the fuel quantity measuring system.

In the section of the NTSB Pilot/Operator Aircraft Accident Report labeled, Recommendation (How Could This Accident have Been Prevented), the pilot stated:

"By closer monitoring of fuel being put on board, by closer monitoring of its use, and by less reliance on the gages. Most importantly by landing at the first sign of any inconsistencies of reading."

Pilot Information

Certificate:	Commercial	**Age:**	48, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	10/28/1996
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	3013 hours (Total, all aircraft), 373 hours (Total, this make and model), 2811 hours (Pilot In Command, all aircraft), 168 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N1224S
Model/Series:	425 425	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	425-0211
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	07/14/1997, Continuous Airworthiness	**Certified Max Gross Wt.:**	8600 lbs
Time Since Last Inspection:	60 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	3836 Hours	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-112
Registered Owner:	INDUCTOTHERM CORP	**Rated Power:**	450 hp
Operator:	INDUCTOTHERM CORP	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	ABE, 394 ft msl	**Distance from Accident Site:**	17 Nautical Miles
Observation Time:	1751 EDT	**Direction from Accident Site:**	347°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Overcast / 11000 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	Variable	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	28°C / 20°C
Precipitation and Obscuration:			
Departure Point:	NIAGARA FALLS, NY (IAG)	**Type of Flight Plan Filed:**	IFR
Destination:	RANCOCAS, NJ (3NJ6)	**Type of Clearance:**	IFR
Departure Time:	1730 EDT	**Type of Airspace:**	Class C

Airport Information

Airport:	PENNRIDGE (N70)	**Runway Surface Type:**	Asphalt
Airport Elevation:	568 ft	**Runway Surface Condition:**	Dry
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	7 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 7 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	ROBERT L HANCOCK	**Report Date:**	06/26/1998
Additional Participating Persons:	ROD BOUREY; ALLENTOWN, PA		
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/.		