



# National Transportation Safety Board Aviation Incident Final Report

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<b>Location:</b>	Peoria, IL	<b>Incident Number:</b>	CEN09IA618
<b>Date &amp; Time:</b>	07/01/2009, 1815 CDT	<b>Registration:</b>	N880SF
<b>Aircraft:</b>	BELL 230	<b>Aircraft Damage:</b>	None
<b>Defining Event:</b>	Sys/Comp malf/fail (non-power)	<b>Injuries:</b>	4 None
<b>Flight Conducted Under:</b>	Part 135: Air Taxi & Commuter - Non-scheduled - Air Medical (Unspecified)		

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## Analysis

The helicopter pilot observed a caution light for the number one hydraulic system and a corresponding complete loss of hydraulic system pressure for that system. The pilot declared an emergency and performed a run-on landing. A postincident examination of the system's hydraulic pump revealed that two of its cover attachment bolts had separated. The bolt heads fractured in tension from their shanks via intergranular cracks which initiated at the fillet radius between the bead and the shank. The bolt fractures exhibited intergranular fracture features over 90 percent of the surface. The operator's incident report safety recommendation stated that the pump's cover bolts should be replaced at overhaul; however, it is not required. The helicopter had accumulated 269 hours since overhaul.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The loss of the number one hydraulic system fluid and hydraulic pressure during cruise due to the failure of the bolts that secure the hydraulic pump's cover.

## Findings

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<b>Aircraft</b>	Pump, main - Failure (Cause)
	Hydraulic fluid - Fluid level (Cause)
	Fasteners - Not specified (Cause)

## Factual Information

On July 1, 2009, at 1815 central daylight time, a Bell 230 helicopter, N880SF, sustained no damage during a forced landing at the General Downing - Peoria International Airport (PIA), near Peoria, Illinois, after it lost fluid in its number one hydraulic system during cruise flight. The commercial helicopter pilot, two emergency medical services (EMS) crewmembers, and the patient were not injured. Visual meteorological conditions prevailed and no flight plan was filed. The local non-scheduled domestic 14 Code of Federal Regulations Part 135 EMS transport flight departed PIA at time unknown.

According to the operator's incident report, the pilot observed a caution light for the number one hydraulic system and a corresponding complete loss of hydraulic system pressure for that system. The pilot declared an emergency and performed a run-on landing. Examination of the system's hydraulic pump revealed that two of its cover attachment bolts had separated. The separated bolt heads were retained by safety wire. This hydraulic pump manufacturer's part number was 65132-1. The Bell Helicopter part number is 222-380-009-105, which is also usable on the Bell 222 series and 430 model helicopters. The bolts that sustained the separation were part number MS24678-17.

According to the helicopter manufacturer, these hydraulic pumps do not have a scheduled overhaul cycle and the pumps are replaced on-condition. The manufacturer does not track the service times of these pumps. Reportedly, this was the first failure of the hydraulic pump cover attachment bolts.

The pump manufacturer had the failed bolts examined. The bolt heads fractured in tension from their shanks via intergranular cracks initiating at the filet radius between the bead and the shank. The bolt fractures exhibited intergranular fracture features over 90 percent of the surface.

According to the operator, the incident pump accumulated 269 hours of time prior to the bolt failures. The operator's incident report safety recommendation indicated, "Recommend pump cover bolts be replaced at overhaul."

## History of Flight

Enroute	Sys/Comp malf/fail (non-power) (Defining event)
Landing	Off-field or emergency landing

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	46, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last Medical Exam:</b>	03/10/2010
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	7100 hours (Total, all aircraft), 865 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	BELL	<b>Registration:</b>	N880SF
<b>Model/Series:</b>	230	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	23024
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	3
<b>Date/Type of Last Inspection:</b>	AAIP	<b>Certified Max Gross Wt.:</b>	8600 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo Shaft
<b>Airframe Total Time:</b>	5673 Hours	<b>Engine Manufacturer:</b>	Rolls Royce
<b>ELT:</b>	C126 installed, not activated	<b>Engine Model/Series:</b>	C30 G/2
<b>Registered Owner:</b>	OSF AVIATION LLC	<b>Rated Power:</b>	hp
<b>Operator:</b>	OSF AVIATION LLC	<b>Air Carrier Operating Certificate:</b>	On-demand Air Taxi (135)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	O84A

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	PIA, 660 ft msl	Observation Time:	
Distance from Accident Site:		Condition of Light:	
Direction from Accident Site:		Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:		Temperature/Dew Point:	
Lowest Ceiling:		Visibility:	
Wind Speed/Gusts, Direction:		Visibility (RVR):	
Altimeter Setting:		Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	Peoria, IL (PIA)	Type of Flight Plan Filed:	Unknown
Destination:	Peoria, IL (PIA)	Type of Clearance:	Unknown
Departure Time:	CDT	Type of Airspace:	

## Airport Information

Airport:	General Downing - Peoria IAP (PIA)	Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	Unknown
Runway Length/Width:		VFR Approach/Landing:	Full Stop

## Wreckage and Impact Information

Crew Injuries:	3 None	Aircraft Damage:	None
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 None		

## Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	Adopted Date:	11/17/2011
Additional Participating Persons:	Stephanie V Williams; Federal Aviation Administration; Springfield, IL		
Publish Date:	04/30/2013		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=78143">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=78143</a>		

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