

Robinson Helicopter Company Accident Report

AIRCRAFT MODEL:	<u>R44 Raven II</u>
SERIAL NUMBER:	<u>10884</u>
REGISTRATION:	<u>N544SC</u>
ACCIDENT DATE:	<u>29 December 2021</u>
ACCIDENT LOCATION:	<u>Cosby, Tennessee</u>
NTSB IDENTIFICATION:	<u>ERA22FA096</u>

REPORT WRITTEN BY: Thom Webster

SIGNATURE: 

SIGNATURE: _____

DATE: 25 MAY 2023

GENERAL ACCIDENT DATA

Time and Location Data

Date of Accident: 29 December, 2021 Time: 1425 Eastern Standard Time
Location: Cosby, Tennessee
GPS Coordinates: 35° 46' 22.00" North, 83° 16' 47.00" West
Surface Elevation: 1960 feet above sea level
Accident Occurred During: Cross country flight
Route of Flight: Gatlinburg Pigeon Forge Airport to accident location
Purpose of Flight: Delivery of newly leased aircraft
Gatlinburg Pigeon Forge Airport, 33 gallons
Last Fuel Point (Location; gal.): (topped off)
Date & Time: 29 December 2021, Time unknown

Helicopter Data

Model: R44 Raven II Serial No. 10884 Registration N544SC

Airworthiness Certificate

Type: Standard Category: Normal Issue Date: 09-07-2005

	<u>Aircraft</u>	<u>Engine</u>
Total Time:	<u>4707.21 hours</u>	<u>4707.21 hours</u>
Time Since Overhaul:	<u>306.61 hours</u>	<u>306.61 hours</u>

Annual Inspection

Date of Last Inspection: 12-28-2021
Time Since Last Inspection 0.6 hours

100 Hour Inspection

Date of Last Inspection:	<u>12-28-2021</u>	<u>12-28-2021</u>
Time Since Last Inspection	<u>0.6 hours</u>	<u>0.6 hours</u>

Owner (Name/Address):: November Alpha LLC
[REDACTED]
Los Angeles, California 90020

Operator (Name/Address):: Lyfted LLC
[REDACTED]
West Valley City, Utah 84119

N/A = Not Applicable

N/O - Not Obtained

Pilot in Command Data

Name: Matthew Jones

Address: [REDACTED] West Valley, Utah 84119

Pilot Certificate No.: [REDACTED]

Date of Birth: [REDACTED]

Citizenship: United States of America

Occupation: Pilot

Seat Occupied: Front Right

Degree of Injury: Severe

Certificates

☐ None ☐ Student ☐ Private ☒ Commercial ☐ Recreational
☐ ATP ☐ Flight Instructor ☐ Flight Engineer ☐ Foreign ☐ Military

Ratings

Airplane: ☒ None ☐ SE Land ☐ ME Land ☐ SE Sea ☐ ME Sea
Other A/C: ☐ None ☒ Helicopter ☐ Gyroplane ☐ Free Balloon ☐ Powered Lift
☐ Airship ☐ Glider
Instrument: ☐ None ☐ Airplane ☒ Helicopter ☐ Powered Lift
Instructor: ☒ None ☐ SE Airplane ☐ ME Airplane ☐ Instr. Airplane ☐ Instr. Helicopter
☐ Glider ☐ Helicopter ☐ Gyroplane ☐ Powered Lift
Mechanic: ☒ None ☐ Airframe ☐ Powerplant ☐ Repair Station ☐ Inspection Authorization

Medical Certificate

Date Issued: 12/2021 Class: First

Limitations: None

Pilot Time (Hours)

<u>Aircraft</u>	<u>Last 24 Hrs.</u>	<u>Last 90 Days</u>	<u>Total</u>	<u>Total PIC</u>
R22				
R44				
Total Helicopter				
Total including all Types			459.9	

Source of Pilot Time Data: Last readable page of pilot's logbook dated 10/2017

N/A = Not Applicable

N/O - Not Obtained

Second Pilot or Passenger Data

Name & Address: Julianne W Gerritsen (aka Julianne Wagner)

West Valley, Utah 84119

Pilot Certificate No.: N/A

Date of Birth:

Citizenship: United States of America

Occupation: President – Lyfted LLC

Seat Occupied: Front left

Degree of Injury: Fatal

Certificates

☒ None ☐ Student ☐ Private ☐ Commercial ☐ Recreational
☐ ATP ☐ Flight Instructor ☐ Flight Engineer ☐ Foreign ☐ Military

Ratings

Airplane: ☒ None ☐ SE Land ☐ ME Land ☐ SE Sea ☐ ME Sea
Other A/C: ☒ None ☐ Helicopter ☐ Gyroplane ☐ Free Balloon ☐ Powered Lift
☐ Airship ☐ Glider
Instrument: ☒ None ☐ Airplane ☐ Helicopter ☐ Powered Lift
Instructor: ☒ None ☐ SE Airplane ☐ ME Airplane ☐ Instr. Airplane ☐ Instr. Helicopter
☐ Glider ☐ Helicopter ☐ Gyroplane ☐ Powered Lift
Mechanic: ☒ None ☐ Airframe ☐ Powerplant ☐ Repair Station ☐ Inspection
Authorization

Medical Certificate

Date Issued: N/A

Class:

Limitations:

Pilot Time (Hours)

<u>Aircraft</u>	<u>Last 24 Hrs.</u>	<u>Last 90 Days</u>	<u>Total</u>	<u>Total PIC</u>
R22				
R44				
Total Helicopter				
Total Other			N/A	

Source of Pilot Time Data:

N/A = Not Applicable

N/O – Not Obtained

Basic Empty Weight, Center of Gravity, Moment

Longitudinal Moment 162846 in- b

$$\begin{array}{r} 105.6 \\ \hline 105.6 \\ \hline 3784.2 \\ \hline 5056.2 \end{array}$$
$$\frac{19506.12}{11217.96}$$
$$\frac{18126}{10251}$$

Longitudinal Moment 216481.68 in- b

Longitudinal Moment 214134.6 in- b

1.4

Instrument and Cabin Data

<u>Instruments:</u>		<u>Switches:</u>	
Vertical Speed	200fpm Ascent	NAV Lights	OFF
Airspeed	Zero	Strobe	OFF
Engine/Rotor Tach.	Lower Pins	Clutch	ENGAGED
Altimeter	410' @ 29.85	Clutch Guard	DOWN
Manifold Pressure	29.50 inhg	Alternator	ON
CAT	N/A	Master	OFF
OAT	Inoperable	Ignition	OFF
Amps	+ Pin	Landing Light	OFF
Oil Pressure	Zero Pin	Heater Blower	N/A
Oil Temperature	Lower Pin	Map Light	OFF
Cyl. Head Temp.	Lower Pin	Governor	ON
Main Fuel	Empty Pin	Air Conditioner	OFF
Aux Fuel	Empty Pin	Intercom	Inoperable
Dimmer/Panel Lights	¼ Bright	Hydraulics	DAMAGED
Clock	Inoperable		
Compass		<u>Control Knobs:</u>	
Hour Meter (Coll)	306.61	Cabin Air	OPEN 1"
Hour Meter (Oil)	354.55	Mixture	Full Rich
Transponder	Inoperable	Mixture Guard	Hanging on chain
Comm/Nav Radios	Inoperable	Carburetor Heat	N/A
Attitude Indicator	Inoperable	Cabin Heat Valve	CLOSED
GPS	Inoperable	Cyclic Friction	OFF
Directional Gyro	Inoperable	Collective Friction	OFF
		Fuel Valve	ON

Survey of Temperature Stickers

Main Rotor Gear Box	All Silver	(220-270)
Tail Rotor Gear Box	140-150 Black, 160-190 Silver	(140-190)
	180 Black, 190-200 Gray,	
Upper Actuator Support Bearing	210-230 Silver	(140-190)
Lower Actuator Support Bearing	Not Obtained	(140-190)
Hydraulic Pump	Not Obtained	(220-270)

Circuit Breaker Information

All circuit breakers were “DOWN” or “IN” except for AUX POWER which was “UP” or “OUT”.

Note that the seat support panel was folded over on top of the circuit breakers.

Warning Light Information

<u>Description</u>	<u>Tight Coil</u>	<u>Stretched Coil</u>
Low Rotor RPM	X	
Low Fuel	X	
TR Chip	X	
Starter On	X	
MR Chip	X	
MR Temp	X	
Clutch	X	
Alternator	X	
Oil Pressure - Engine	X	
Governor OFF	X	
Rotor Brake	X	
Carbon Monoxide	X	
Engine Fire	X	
Fuel Filter	X	
Aux Fuel Pump	X	

Weather at Time of Accident

Reporting Point Location	Gatlinburg Pigeon Forge Airport @ 14:15 Local Time		
Distance from Accident Site	15 Nautical Miles		
Direction from Accident Site	North West		
Sky Cover	Scattered @ 1800' AGL, Broken @ 3400' AGL		
Wind	None	Temperature	17°C
Visibility	10 Statute Miles	Dew Point	16°C
Turbulence	None Reported	Altimeter Setting	29.86 inhg
Source of Weather	As reported by NTSB		

Reporting Point Location			
Distance from Accident Site			
Direction from Accident Site			
Sky Cover			
Wind		Temperature	
Visibility		Dew Point	
Turbulence		Altimeter Setting	
Source of Weather			

Flight Plan: None

Weather Brief: Unknown

Ground Conditions at Accident Site

Thick forest on steep hillside.

Ground Damage

None

CONTACTS

NTSB Investigator in Charge

Name: Peter Wentz
Title: Air Safety Investigator
Address: [REDACTED]
Ashburn, Virginia 20147
Tel: [REDACTED] Fax: [REDACTED] Email: [REDACTED]

FAA Investigator

Name: Neal Thorne
Title: Aviation Safety Inspector
Address: [REDACTED]
Nashville, Tennessee 73217
Tel: [REDACTED] Fax: [REDACTED] Email: [REDACTED]

Powerplant Air Safety Investigator

Name: James (Mike) Childers
Title: Senior Air Safety Investigator
Address: [REDACTED]
Williamsport, Pennsylvania 17701
Tel: [REDACTED] Fax: [REDACTED] Email: [REDACTED]

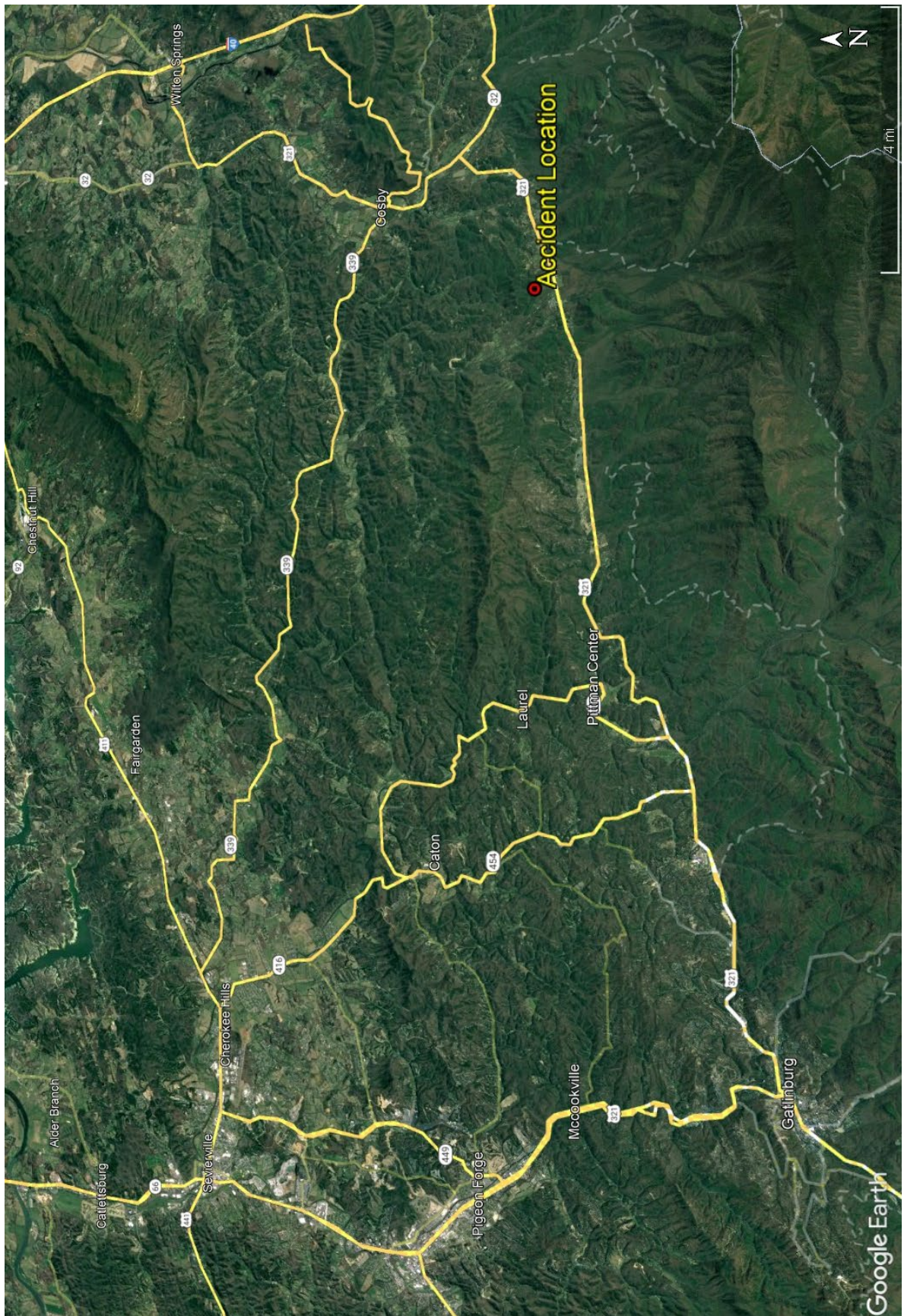
Recovery Company

Name: [REDACTED]
Address: [REDACTED]
Tel: [REDACTED] Fax: [REDACTED] Email: [REDACTED]

Local Law Enforcement

Name: Sevier County Sheriff's Department
Address: [REDACTED]
Sevierville, Tennessee 37862
Tel: [REDACTED] Fax: [REDACTED] Email: [REDACTED]

ACCIDENT LOCATION







WRECKAGE DISTRIBUTION LEGEND

[illegible]



WRECKAGE EXAMINATION - GENERAL

On 30 and 31 December, 2021, an examination of the main wreckage and the accident location were performed. Present for the examinations were Peter Wentz (NTSB), Neal Thorne (FAA) and Thom Webster (RHC).

Due to inclement weather, the wreckage was recovered several days later and transported to AMF Aviation in Springfield, Tennessee, where it was secured.

On 12 January, 2022, a detailed examination of the wreckage was performed at the AMF facilities. Present for this examination were Neal Thorne (FAA), Mike Childers (Lycoming) and Thom Webster (RHC). Details and photographs of both examinations are in the following pages.



Accident location looking west.



Accident location looking north.



Above and below: Accident location looking south.





Above and below: Accident location looking east.





Above and below: Main wreckage after recovery.



CABIN

The floor of the cabin structure was deformed upward, more severely at the nose. A tree trunk pierced thru the belly, up between the aft seats and protruded out the aft right door.

The upper console was separated from the lower console and tethered by wires. The lower console was deformed and crushed rearward.

The pilot's cyclic grip was disconnected from the crossbar. The surface of the disconnect was angular and jagged. The left side cyclic control was installed. The collective was positioned approximately mid-travel. The removable collective and tail rotor pedals were recovered on the aft left floor. The pilot's tail rotor pedals were positioned with the left pedal forward.

The front right seat structure was severely deformed. The front left seat structure was moderately deformed. Both aft seat structures were severely deformed and the seat backs/bulkhead was folded over the seat bottoms.

The front right seat belt buckle was unlatched (reportedly by first responders), the other three were buckled.

Personal items recovered consisted of two backpacks, two suitcases, extra headsets and the pilot's flight bag with his logbook.



Above and below: Right side of cabin prior to recovery.





Left side of cabin prior to recovery.



Nose of the cabin prior to recovery.



Upper instrument panel.



Lower instrument panel.



Oil pressure activated hourmeter.



Radar altimeter.



Avionics panel.



Cyclic panel.



Circuit breaker panel.



Collective activated Hourmeter.



Cyclic control.



Pilot's cyclic grip and crossbar.



Landing light switch.



Collective control.



Collective friction slider and knob.



Position of hardware on friction slider.



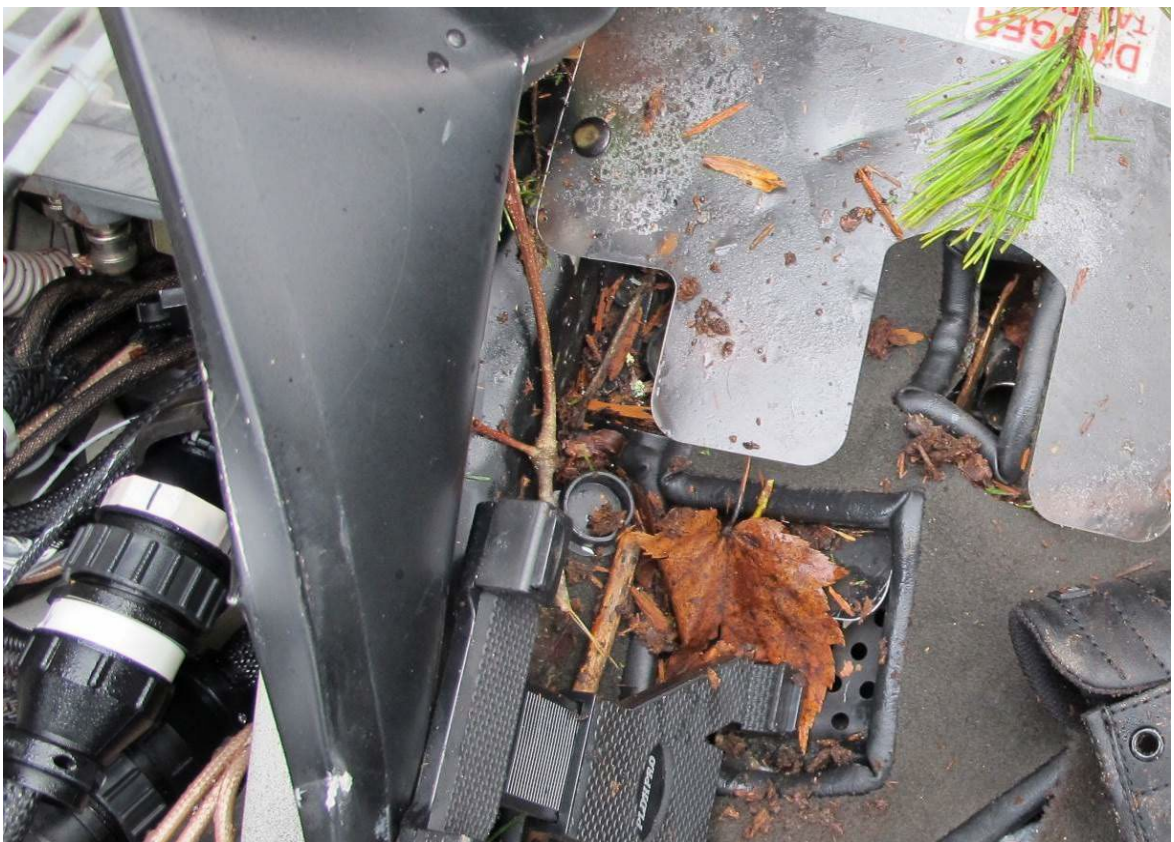
Co-pilot's collective socket.



Removable collective and tail rotor pedals.



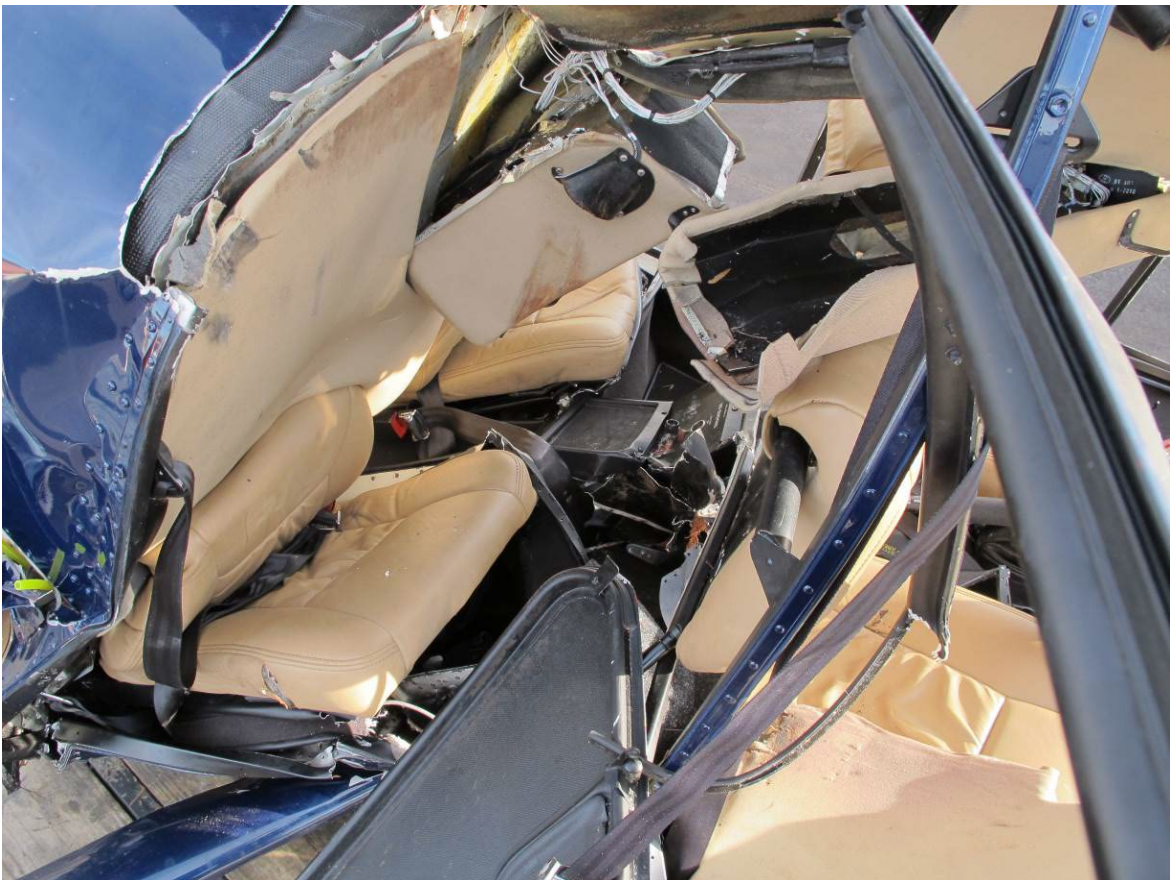
Pilot's tail rotor pedals.



Co-pilot's tail rotor pedal sockets.



Front seats.



Rear seats.



Front right seat.



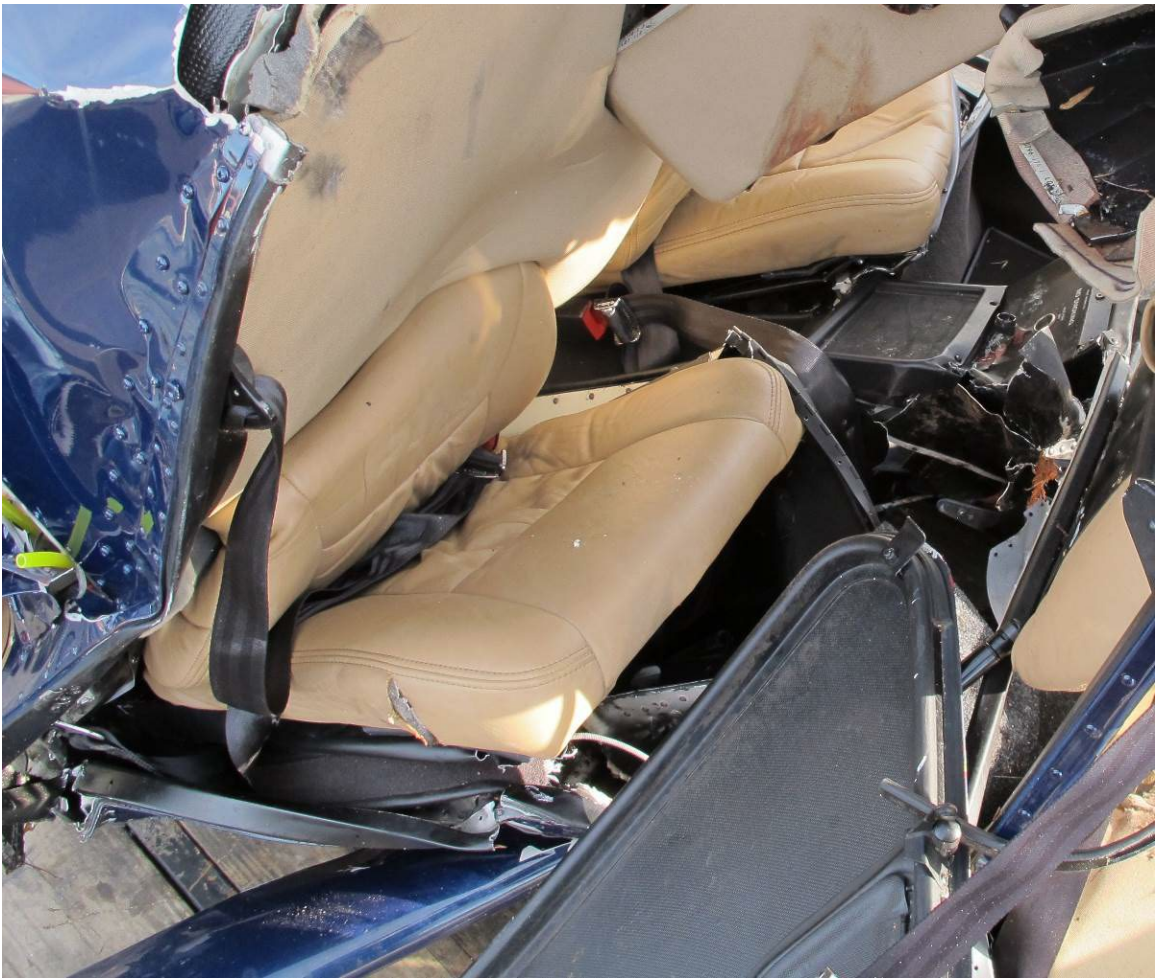
Front right seat structure.



Front left seat.



Front left seat structure.



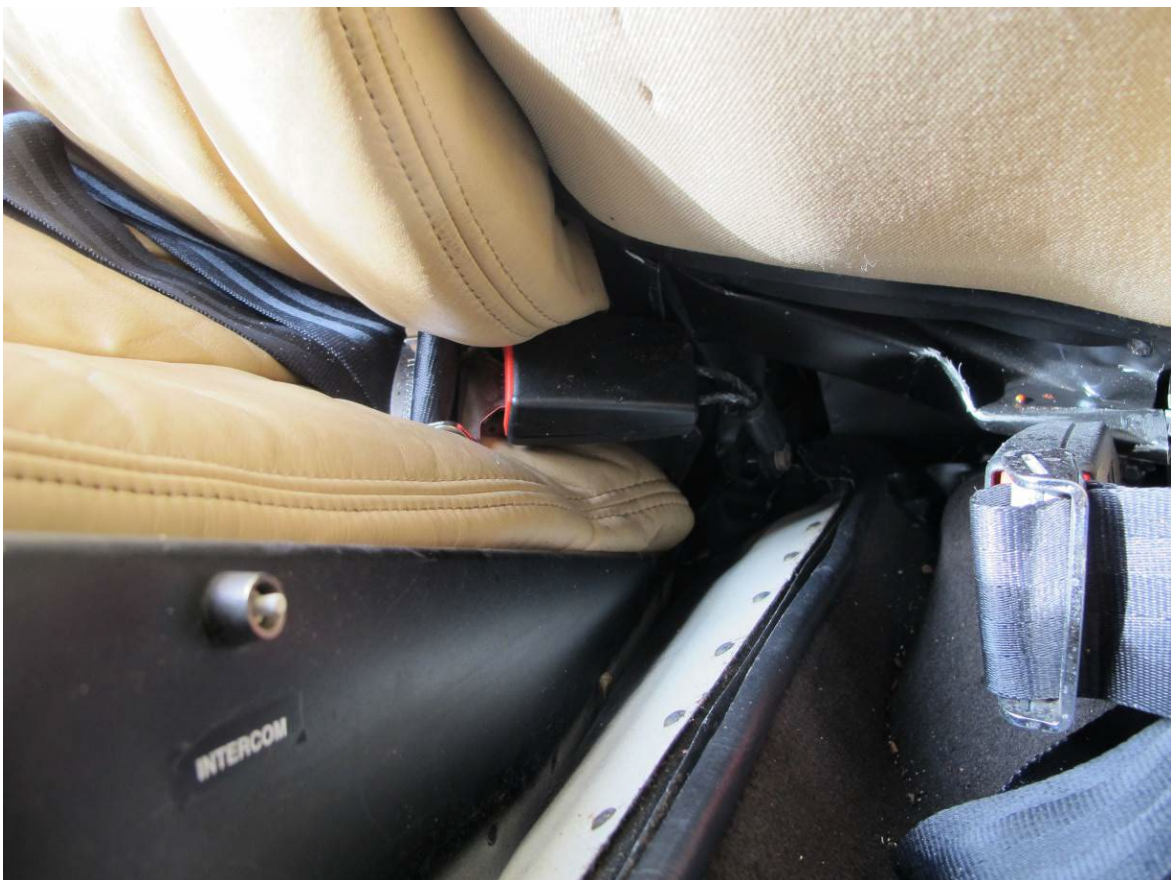
Aft right seat.



Aft left seat.



Front seat belt buckles and latches.



Rear seat belt buckles and latches.



Above and below: Personal items recovered.





Above and below: Personal items recovered.





Above and below: Personal items recovered.



FUEL SYSTEM

The main fuel tank sustained impact damage to the forward end of the outer shell, but the bladder was not compromised. The filler cap remained secure on the filler neck. The main fuel tank appeared to be half full of 100LL aviation fuel, blue in color with proper aroma. No water was present in the sample taken.

The auxiliary fuel tank sustained impact damage to the forward end of the outer shell, but the bladder was not compromised. The filler cap remained secure on the filler neck. The auxiliary fuel tank appeared to be full of 100LL aviation fuel, blue in color with proper aroma. No water was present in the sample taken.

The fuel lines and hoses remained secure to their fittings.

The fuel tank vent tubes were separated from the rollover valves. The tubes and hoses were clear when blown through. The rollover valves operated properly.

The gascolator sustained impact damage. The bowl contained no fuel. The screen was clean.

The fuel shutoff knob was mostly in the on position. The connecting rod was damaged.



Main fuel tank.



Main fuel tank filler neck and cap.



Auxiliary fuel tank.



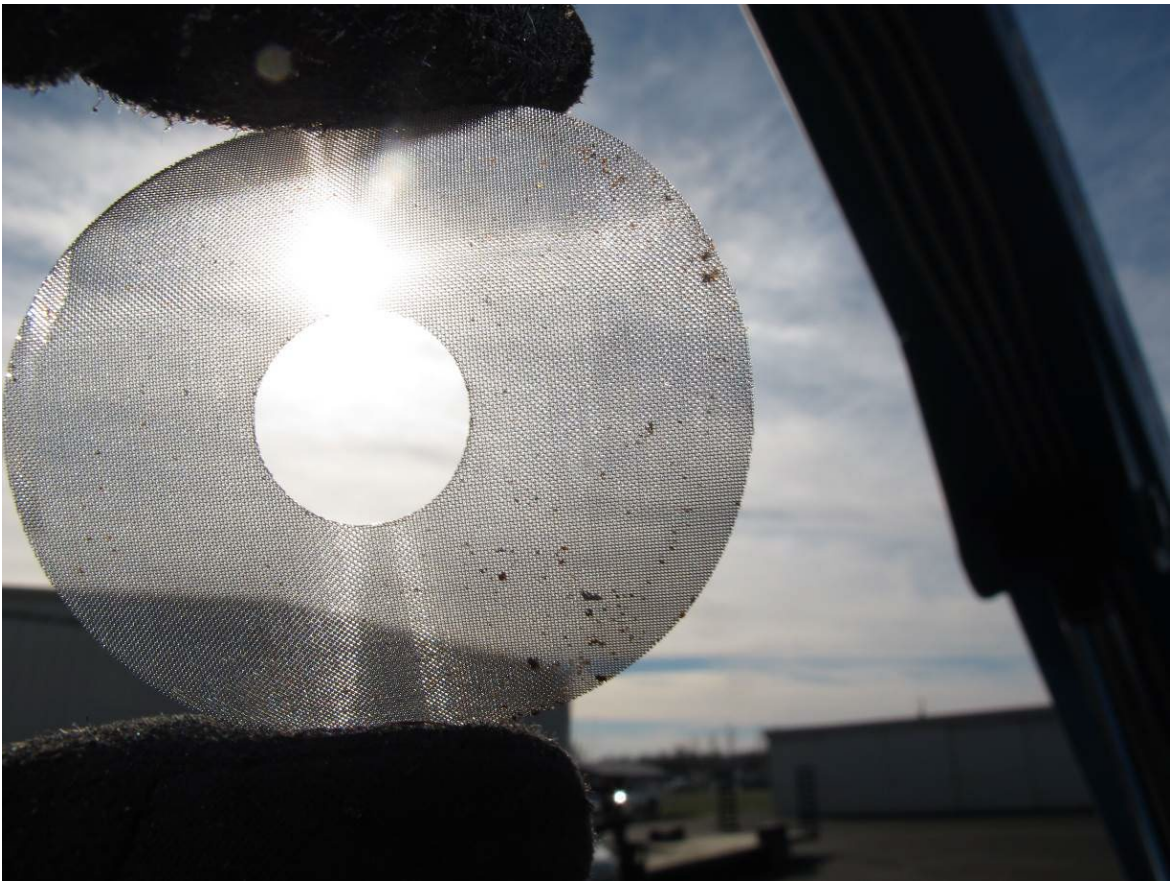
Auxiliary fuel tank filler neck and cap.



Gascolator assembly.



Gascolator bowl.



Gascolator screen,



Fuel vent system rollover valves.



Above and below: Fuel vent tubes and hoses.





Fuel sample from main fuel tank.



Fuel sample from auxiliary fuel tank.



Fuel knob position.

POWERPLANT CONTROLS

The fuel mixture control knob was in the full rich position. The fuel mixture guard was hanging on the console. The fuel mixture arm on the fuel control unit was in the cutoff position. The control wire sheathing was secure in the mounting clamps. The control wire sheathing was stretched due to impact damage.

The throttle grip was in a fully open position as was the throttle valve in the fuel control unit.

The governor switch was in the on position.



Fuel mixture control knob.



Fuel mixture arm on fuel control unit.



Fuel mixture control wire sheathing stretched.



Throttle grip position.



Throttle valve position.



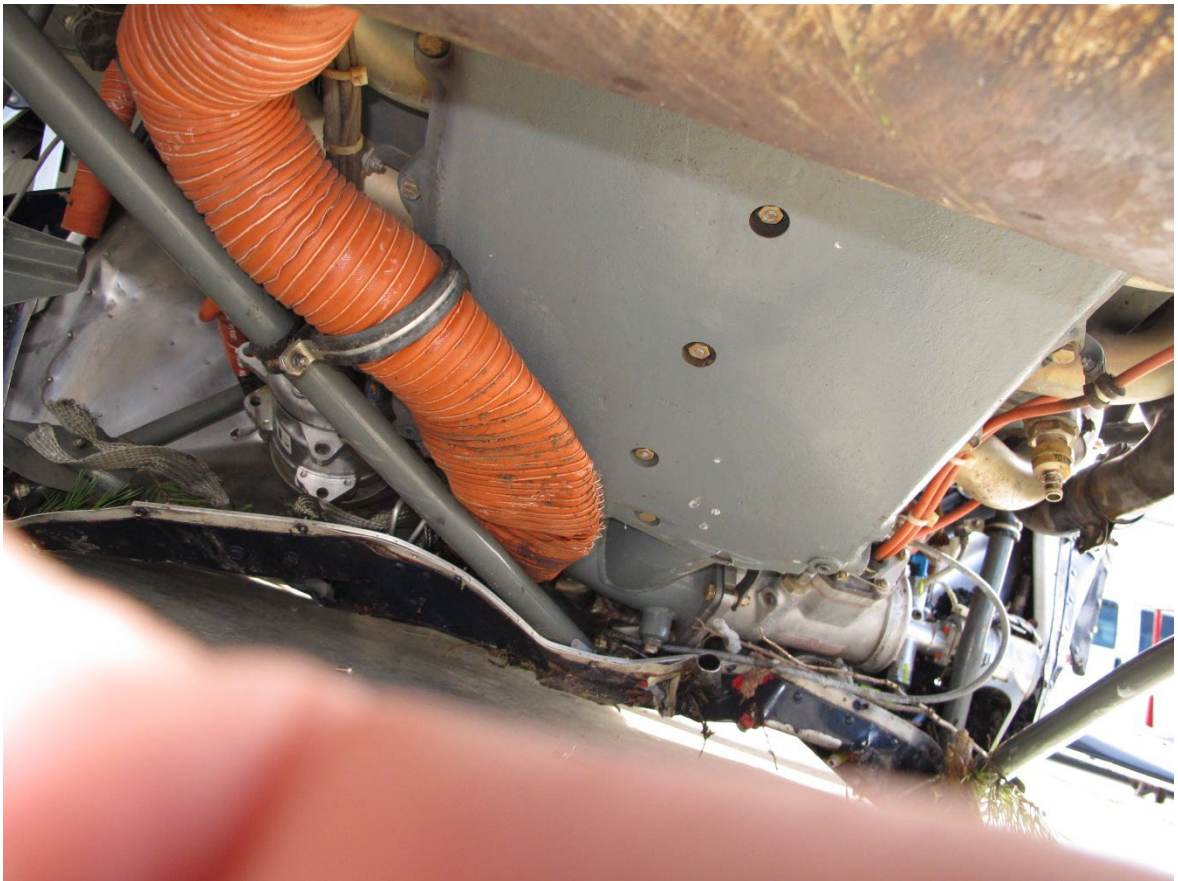
Governor switch.



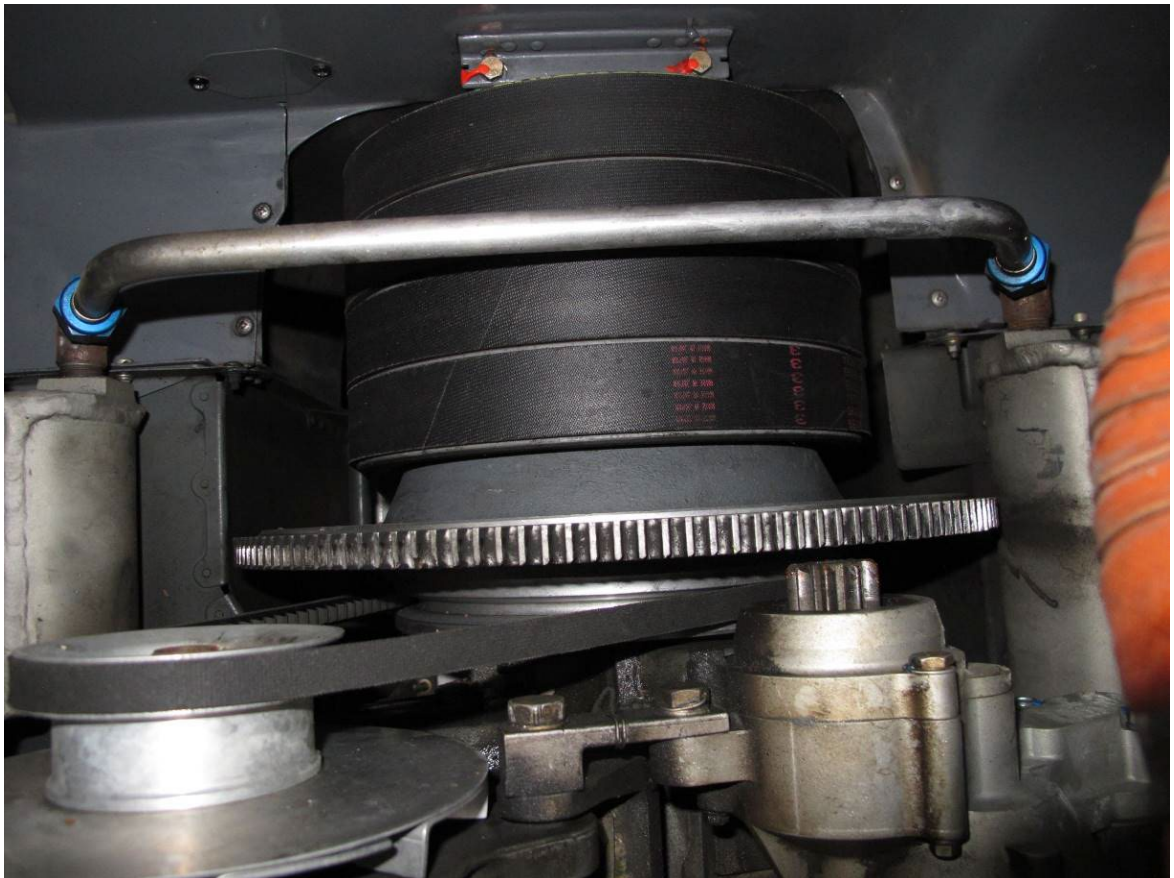
Engine left side (aircraft right).



Engine right side (aircraft left).

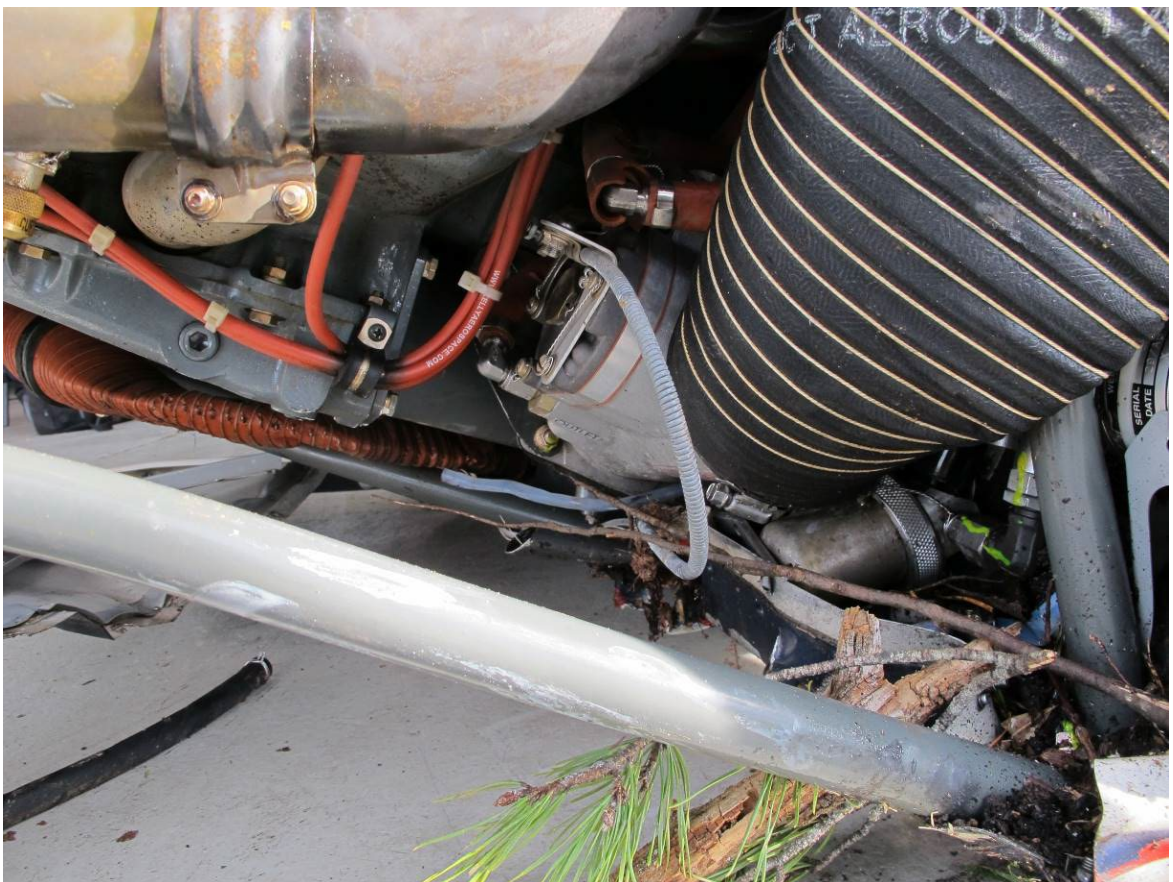


Above and below: Bottom of engine.





Cooling fan and scroll.



Fuel control unit.



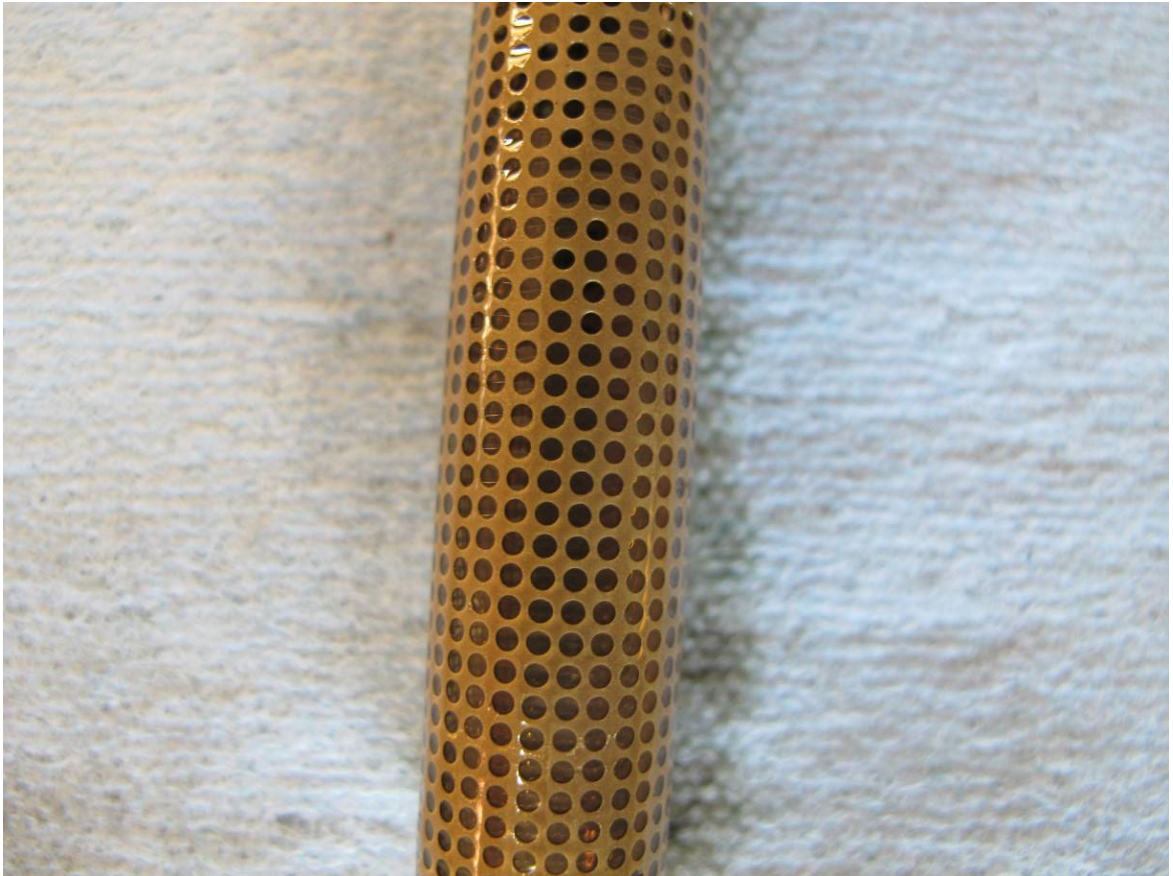
Intake screen and hose.



Air filter.



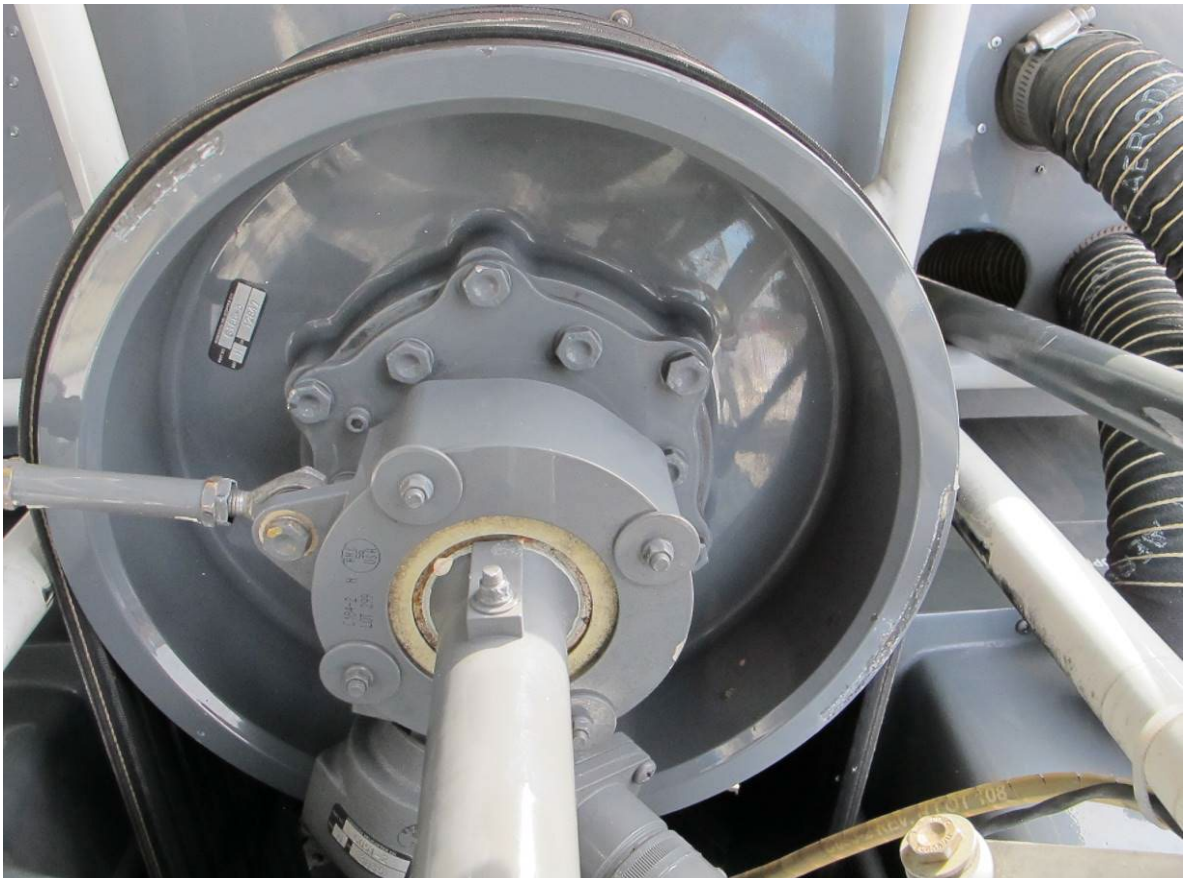
Lower spark plugs.



Oil sump screen.



Engine data plate.



Score marks on aft face of upper sheave.



Paint transfer on jam nut of clutch centering strut.



Rubber transfer on right side of upper frame.



Rubber transfer on left side of upper frame.

DRIVE

The grooves in the lower and upper sheaves appeared to have normal wear. The V-belts remained in their grooves on the lower sheave and were positioned one groove forward on the upper sheave. The V-belts appeared to have no abnormal wear. The belt tension actuator was bent at the screw tube and the overtravel activation cable was fully extended. The extension distance between the scissor mounts was approximately 1.3”.

The lower and upper actuator support bearings rotated smoothly by hand.

The upper sheave rotated smoothly on the clutch shaft when moved by hand in a clockwise direction (looking forward) and locked on the shaft when moved in a counterclockwise direction.

The forward flex coupling was undamaged.

The main rotor gearbox was undamaged and remained secure to the upper frame. Oil, blue in color, was visible in the sight gauge. The mast tube and driveshaft remained straight. The main rotor was rotated by hand more than 360° with no anomalies in the gearbox, confirming continuity from the upper sheave to the main rotor.

The main rotor hub had no contact marks from the main rotor blade spindle boots. Both elastomeric teeter stops were dented across the centers with no damage to their brackets. The droop stops and tusks appeared to be undamaged.

Main rotor blade serial number 12234 was bent upward approximately 45° about 8 feet out from the hub and had several chordwise creases throughout. A 3’ section of the tip was disconnected. The surface of the disconnect was angular and jagged with a portion of afterbody (skin and honeycomb) was pulled away from the spar, leaving an equal amount of adhesive on both surfaces.

Main rotor blade serial number 12227 was bent upward approximately 90° about 5 feet out from the hub and was bowed upward slightly throughout the mid-section. A 5’ section of the tip was disconnected. The surface of the disconnect was angular and jagged.

Both ears of the clutch shaft yoke of the intermediate flex coupling were bent and disconnected. The surface of the disconnect was angular and jagged. The flex plate was also bent.

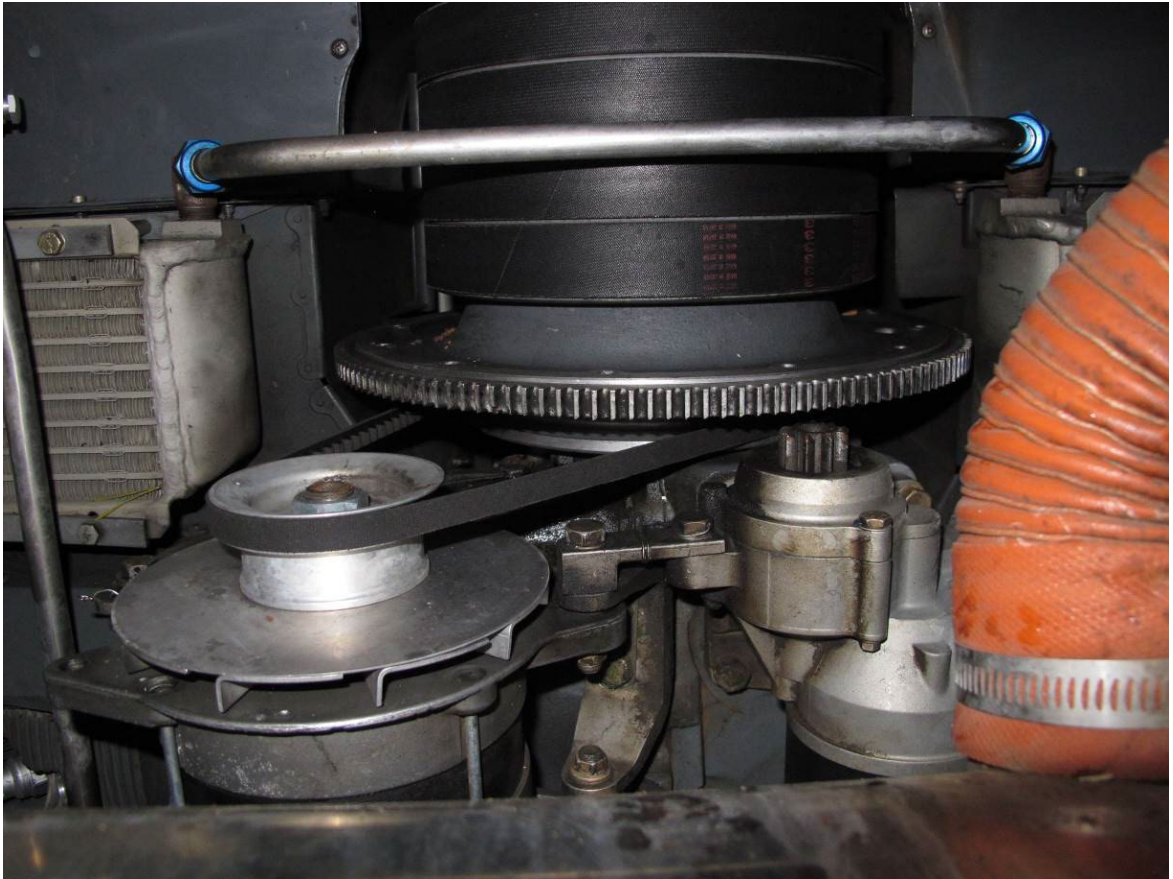
The tail rotor driveshaft was recovered separated from the tailcone and had a disconnect near the aft end. The surface of the disconnect was angular and jagged with one side flattened and folded over. The tail rotor driveshaft damper bearing rotated smoothly by hand and remained in place on the shaft, but the housing was separated.

The support bracket was disconnected from the bulkhead. The surface of the disconnect was angular and jagged. The friction link was bent slightly, but still moved smoothly with normal resistance.

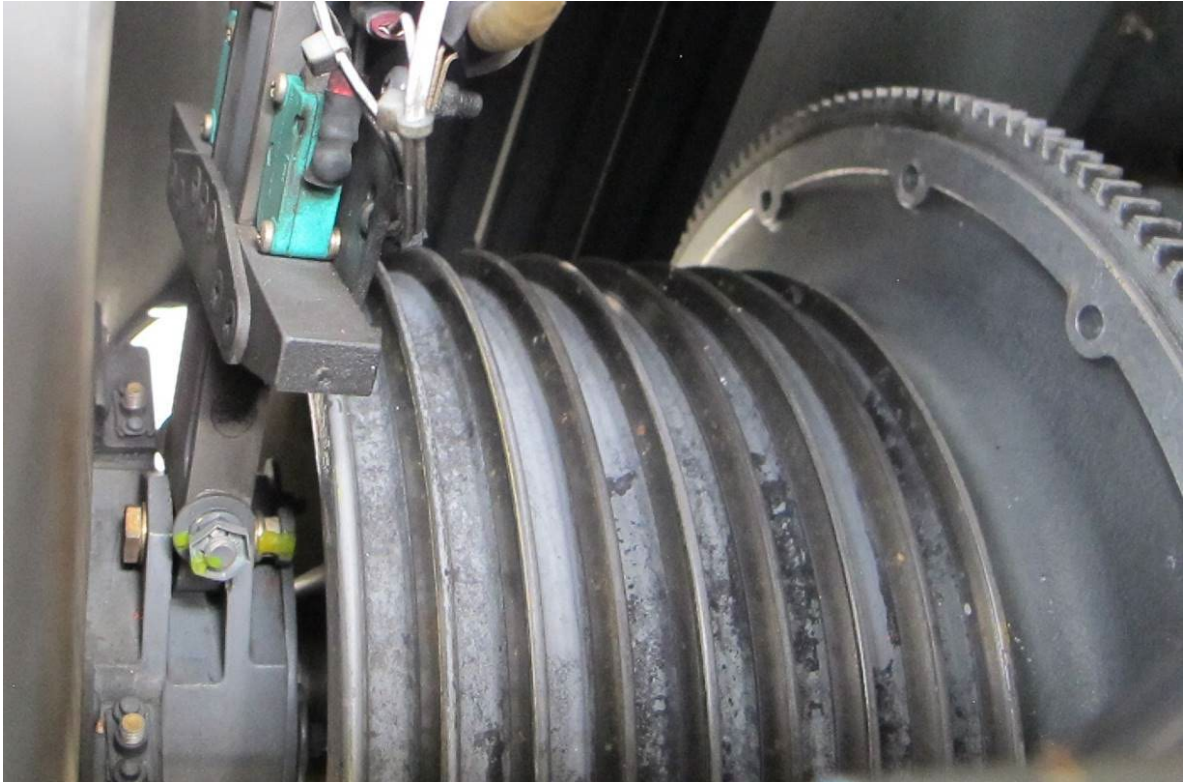
The flex plate of the aft flex coupling was disconnected from the tail rotor gearbox input yoke. The surface of the disconnects were angular and jagged and the plate along with the yoke arms were bent.

The tail rotor gearbox mounting flanges bolts were secure, but one of the flanges was disconnected and one was bent coinciding with damage to the bulkhead casting. The surface of the disconnects were angular, jagged, and flat gray in color. The input yoke rotated smoothly by hand more than 360° of the tail rotor with no anomalies confirming continuity throughout the gearbox. Oil, blue in color, was visible in the sight gauge. The chip detector was clear of any debris. The output shaft remained straight.

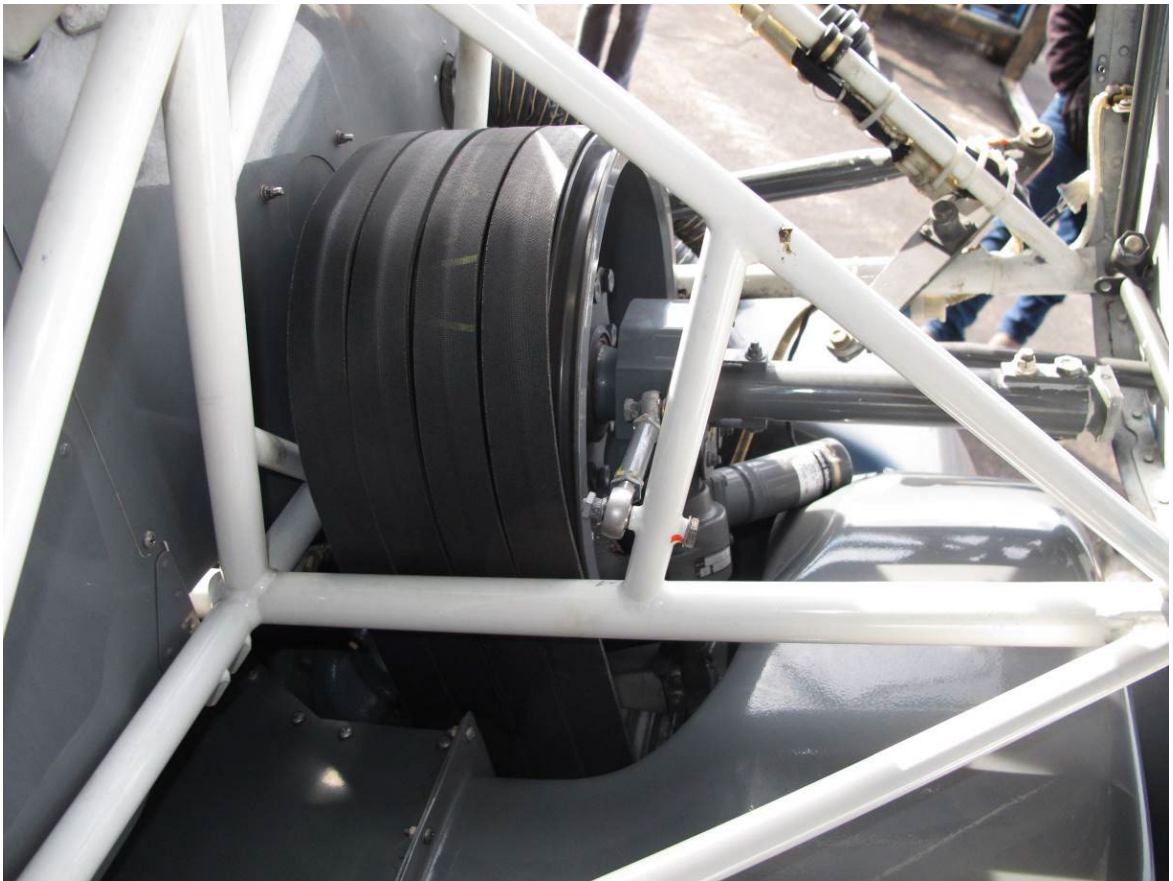
Both tail rotor blades were disconnected at the root. The surface of the disconnects were angular and jagged. Tail rotor blade serial number 10548 had a 2", round shaped dent in the leading edge near the tip. Tail rotor blade serial number 10549 had several dents in the leading edge and the tip section was disconnected.



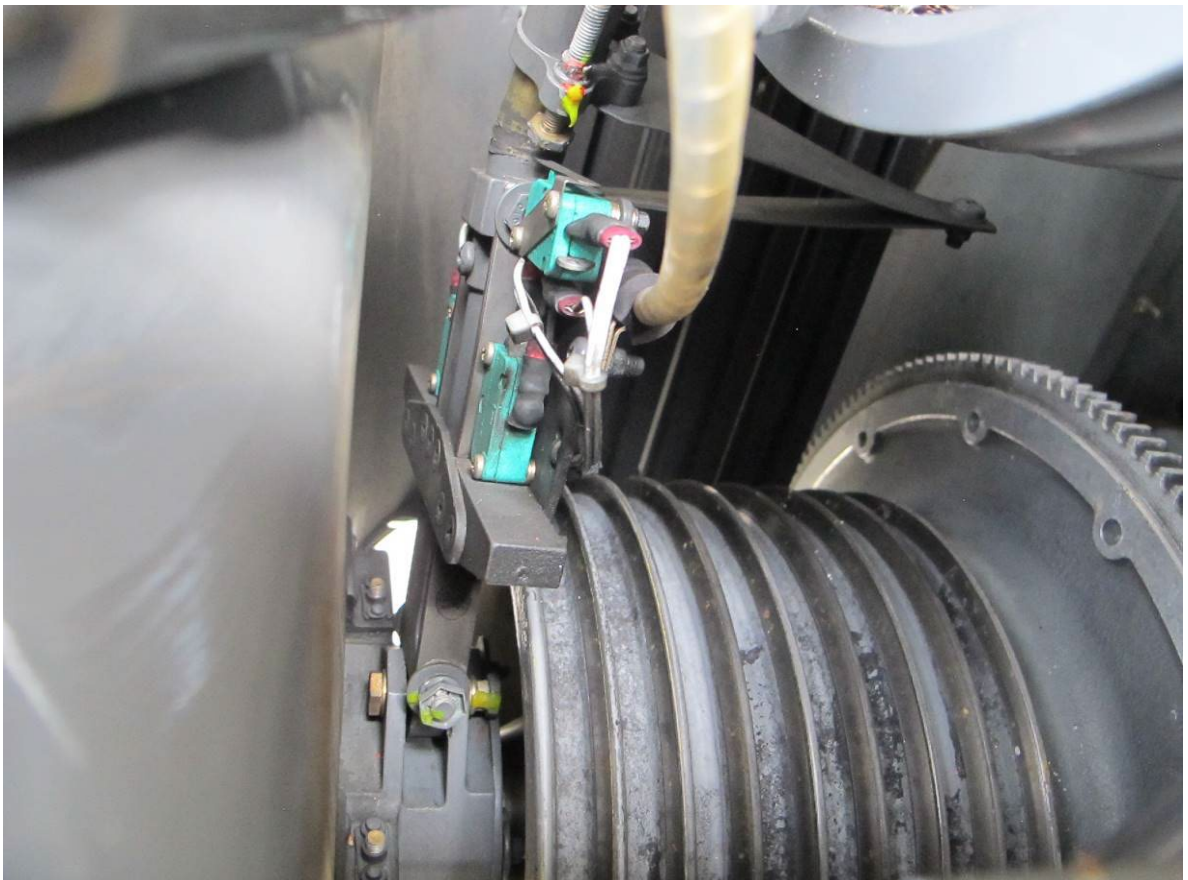
V-belts on lower sheave.



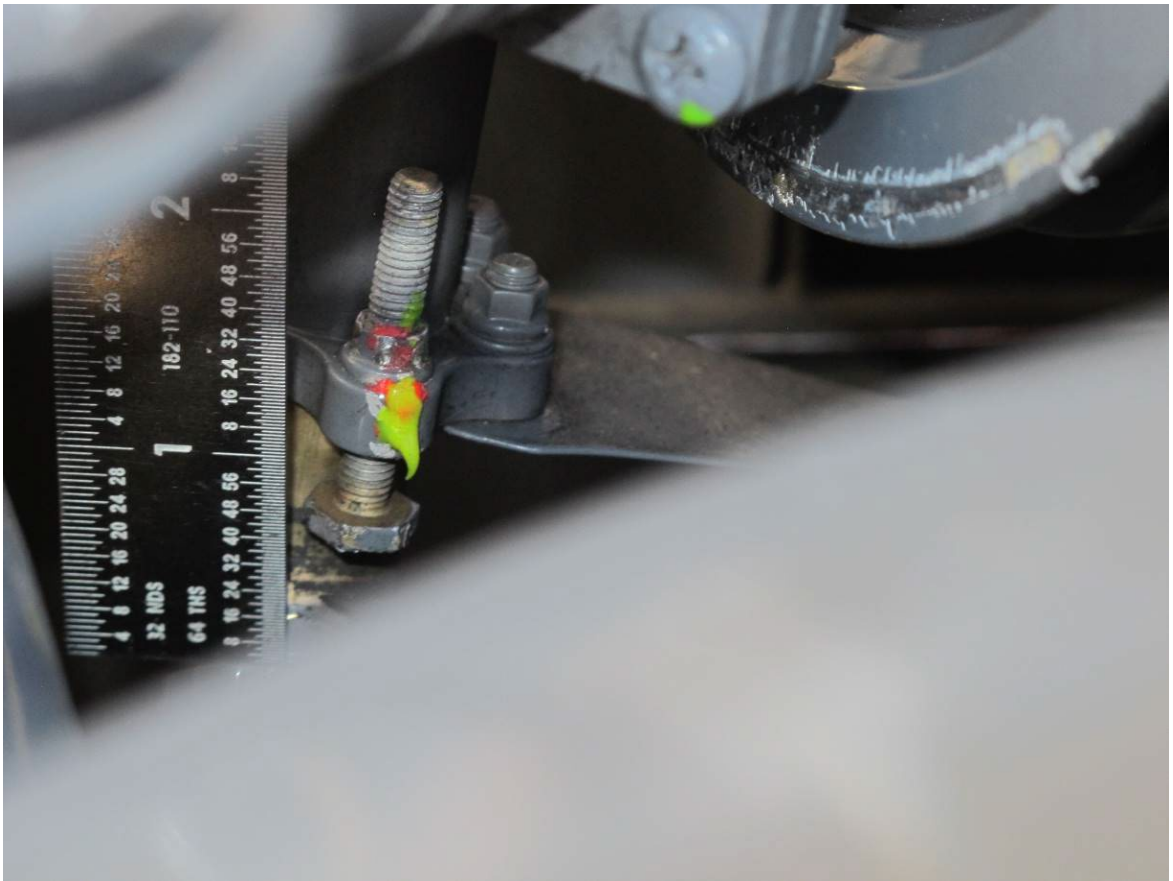
Grooves of lower sheave.



V-belts on upper sheave.



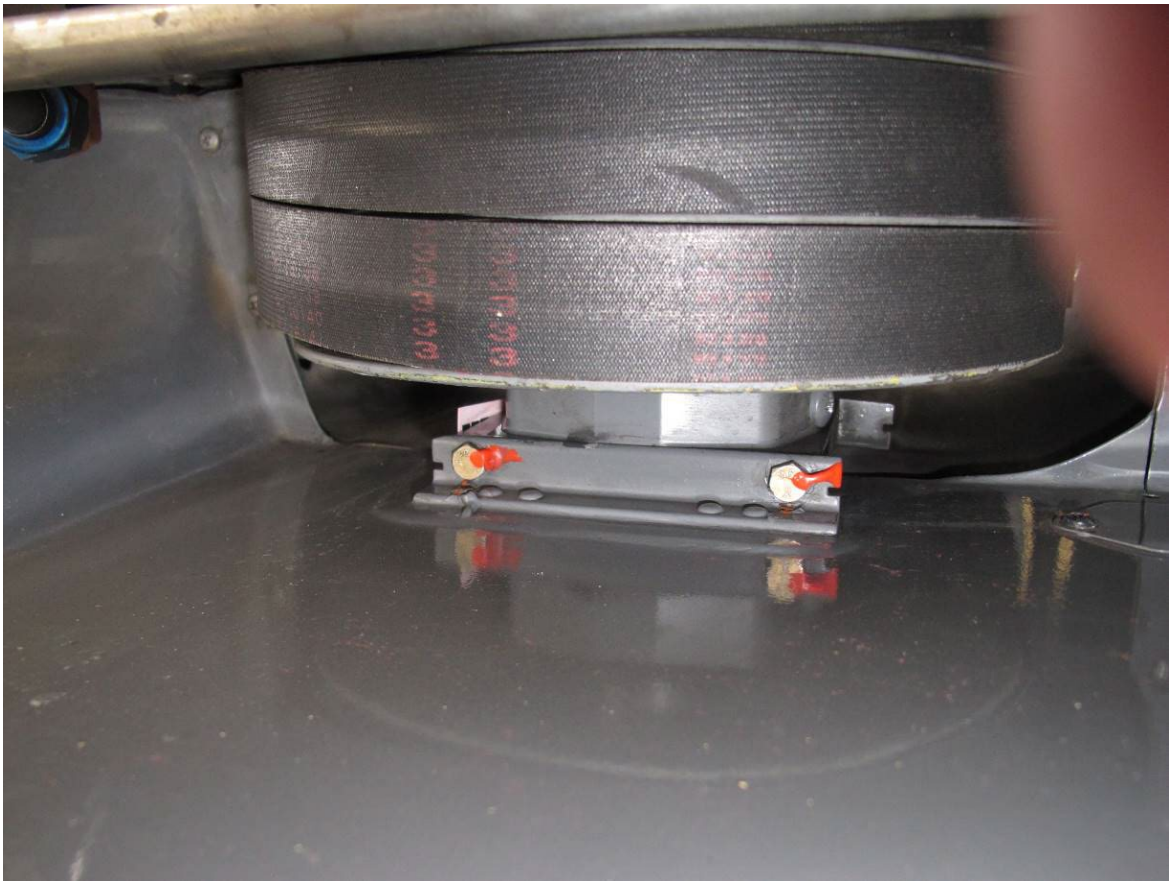
Belt tension actuator.



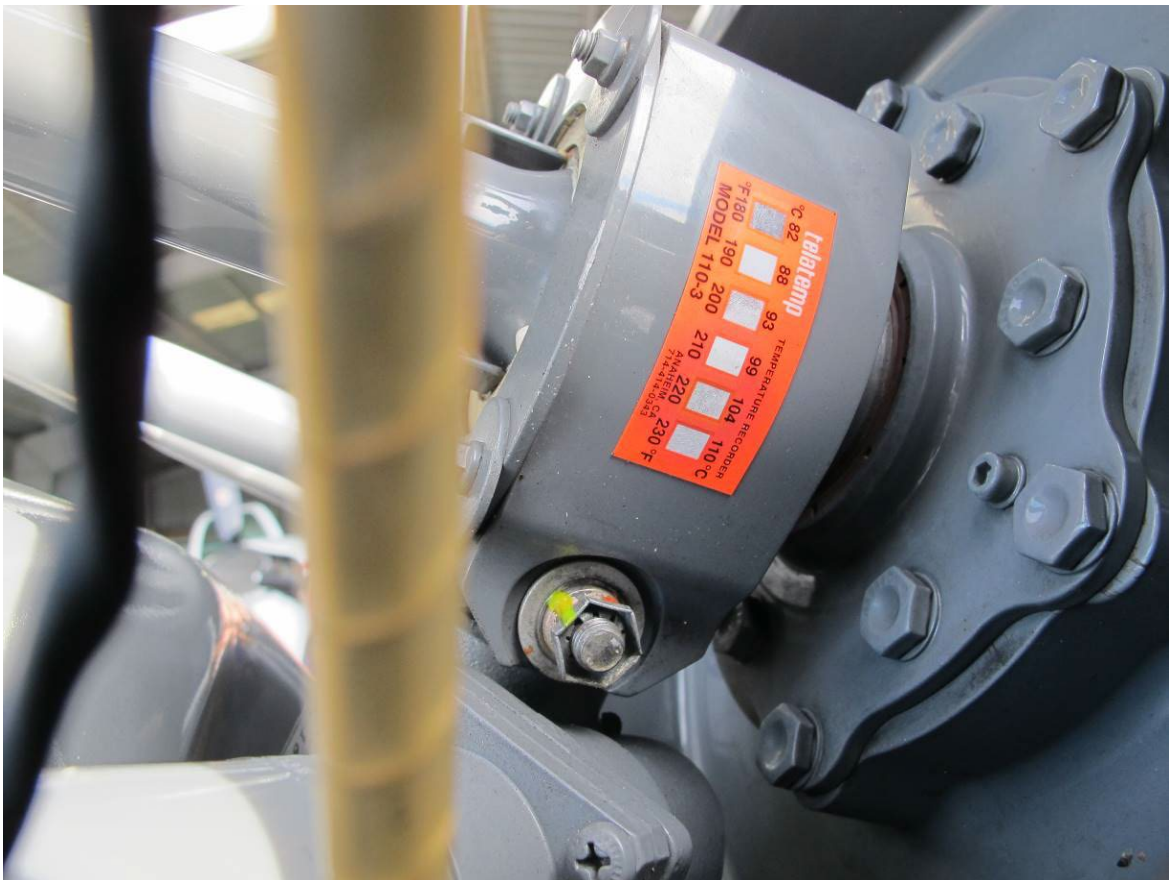
Actuator extension distance.



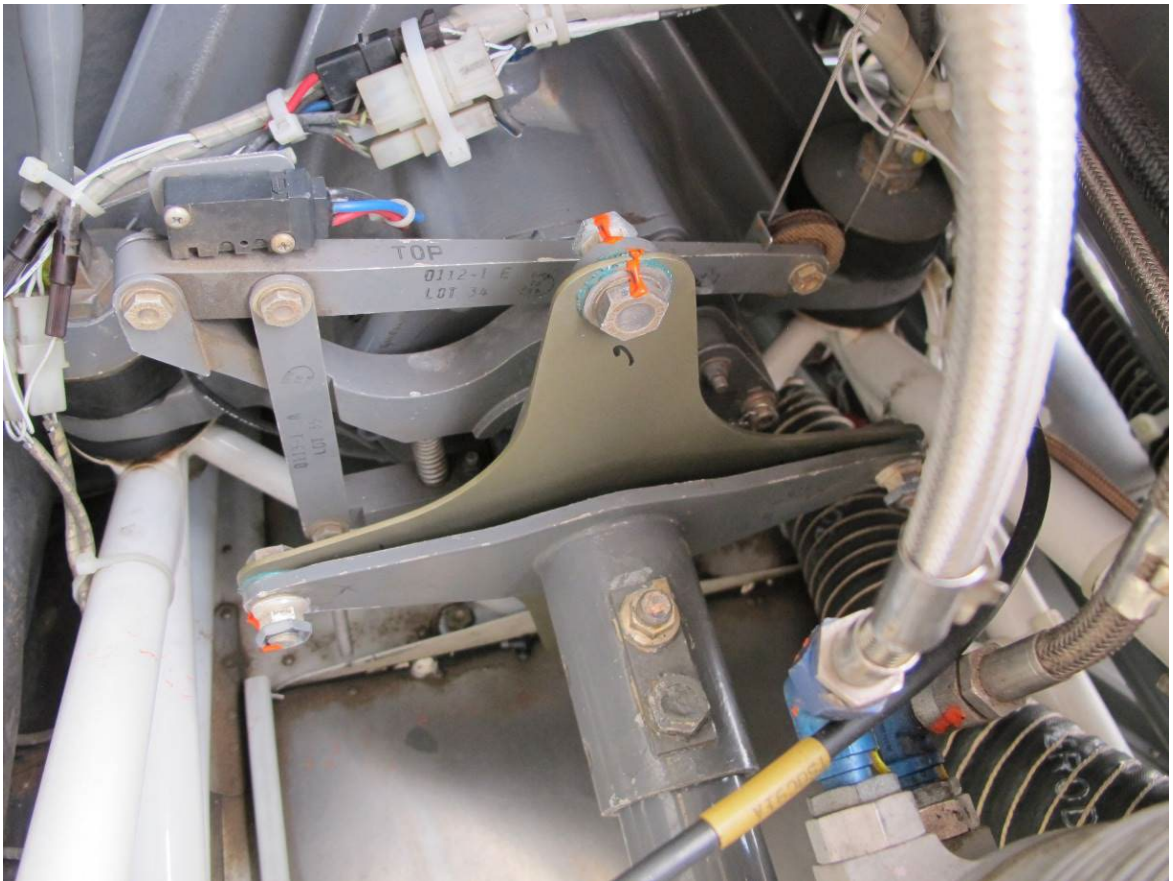
Overtravel switch activation cable.



Lower actuator support bearing and brackets.



Upper actuator support bearing.



Forward flex coupling.



Main rotor gearbox.



Main rotor mast tube.



Top of the main rotor hub.



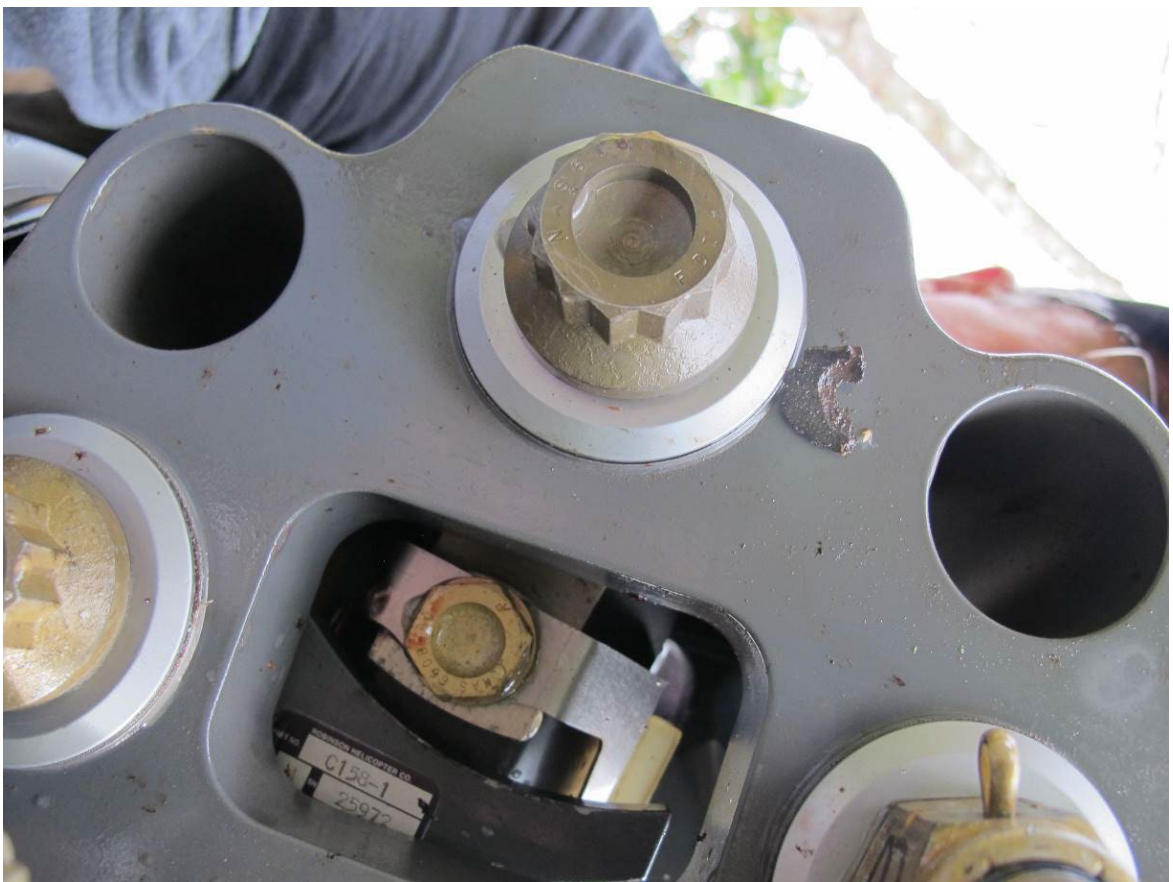
Elastomeric teeter stop for main rotor blade serial number 12234.



Elastomeric teeter stop for main rotor blade serial number 12227.



Droop stop for main rotor blade serial number 12234.



Droop stop for main rotor blade serial number 12227.



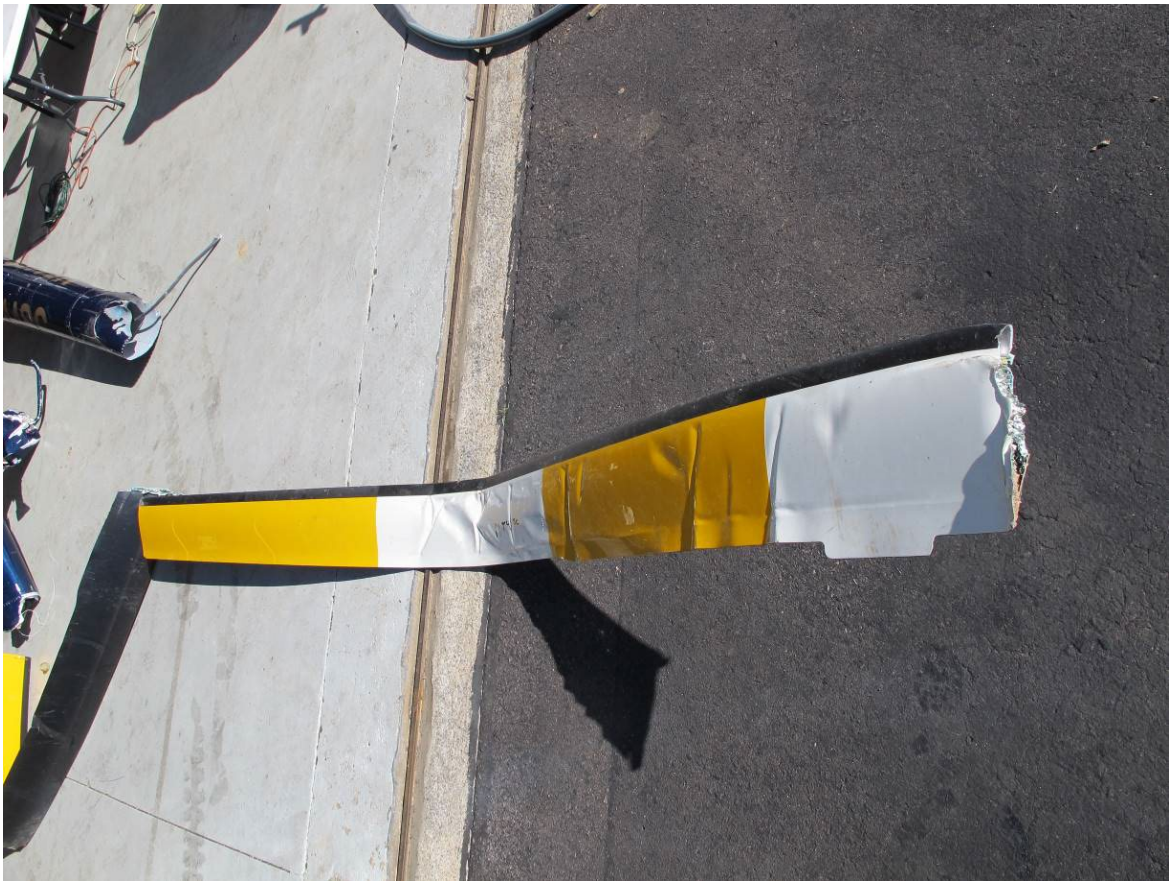
Above and below: Main rotor blades at the accident site.





Above and below: Main rotor blade serial number 12234.





Above and below: Main rotor blade serial number 12234.





Above and below: Disconnect surfaces of main rotor blade serial number 12234.





Above and below: Tip section of main rotor blade serial number 12234.





Above and below: Main rotor blade serial number 12227.





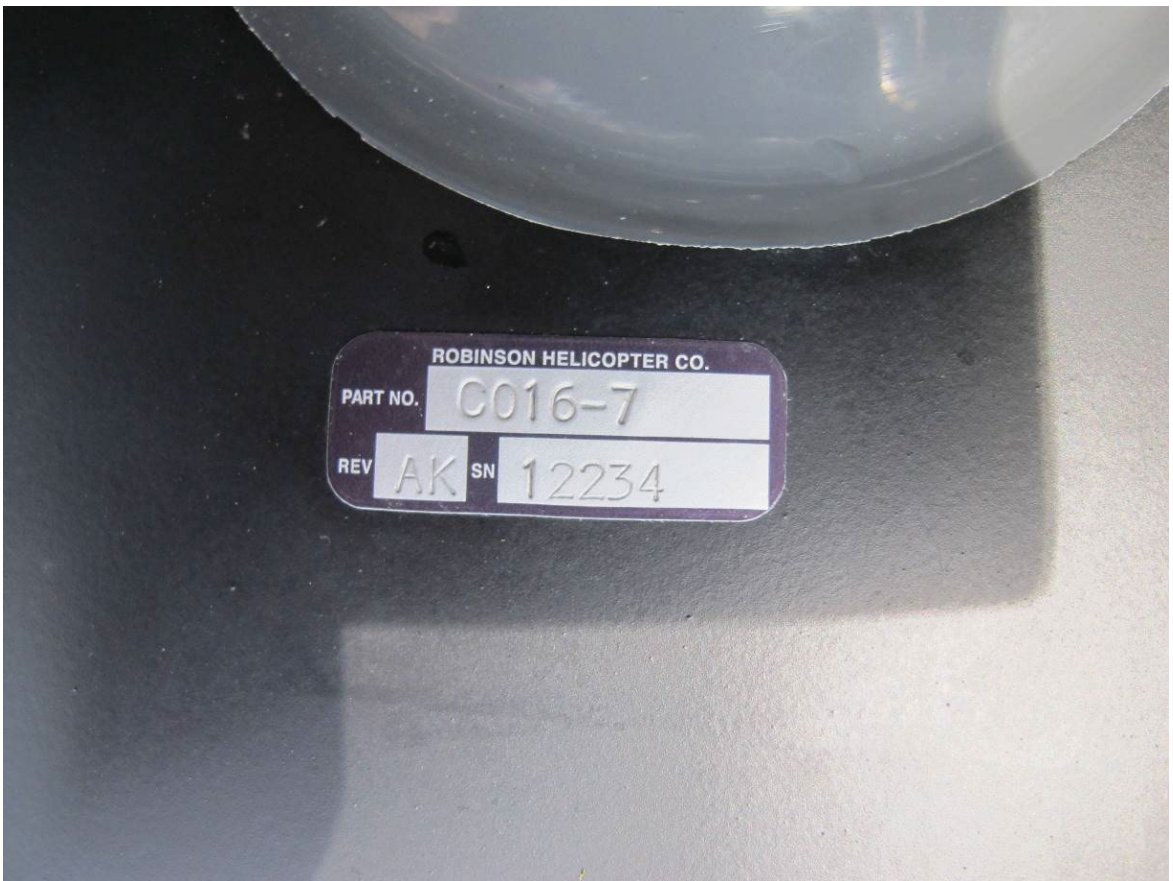
Above and below: Disconnect surfaces of main rotor blade serial number 12227.





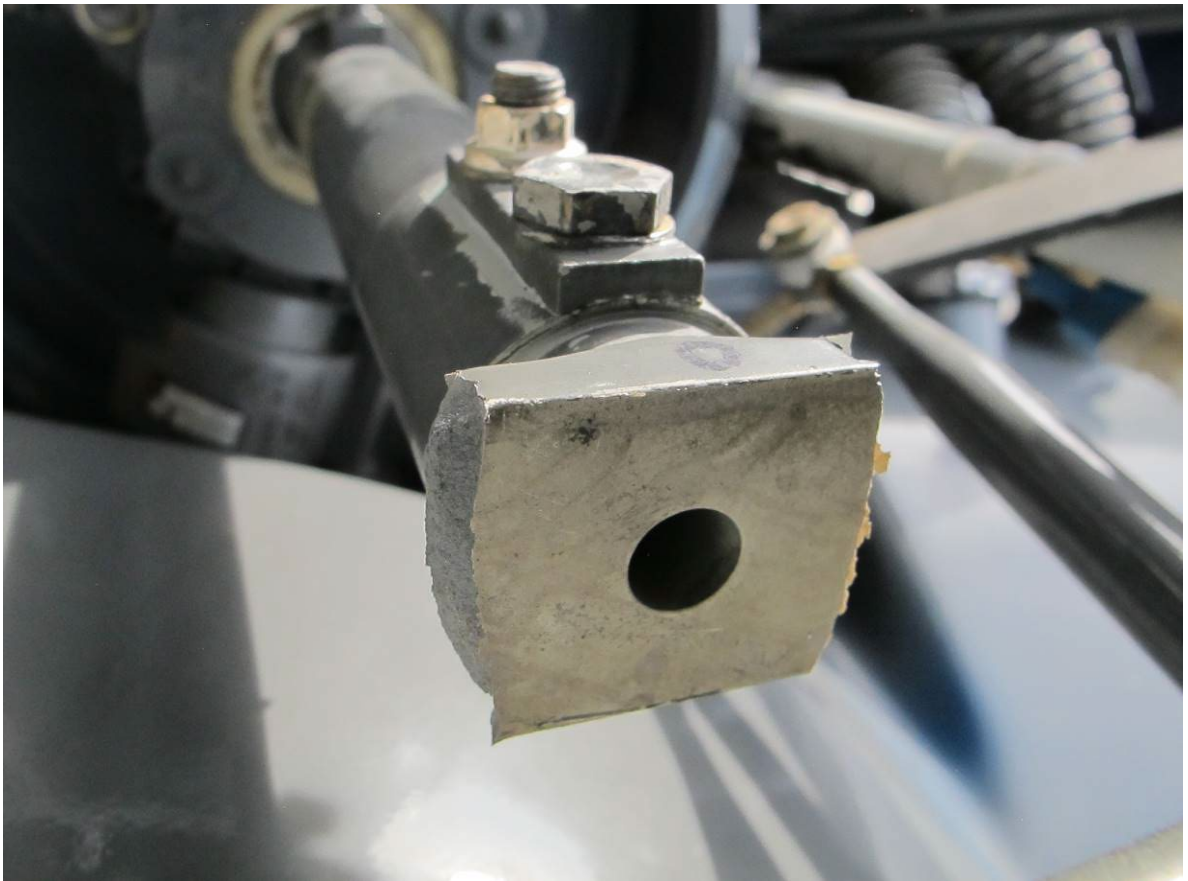
Above and below: Tip section of main rotor blade serial number 12227.





Main rotor blade data plates.





Above and below: Disconnect in intermediate flex coupling.





Forward section of tail rotor driveshaft.



Tail rotor driveshaft damper bearing and hanger support.



Aft section of tail rotor driveshaft.



Disconnect surface on forward section of tail rotor driveshaft.



Disconnect surface on aft section of tail rotor driveshaft.



Aft flex coupling.



Tail rotor gearbox input yoke portion of aft flex coupling.



Tail rotor gearbox.



Tail rotor gearbox temperature sensor.



Tail rotor gearbox chip detector.



Tail rotor hub.



Tail rotor blades.



Above and below: Tail rotor blade serial number 10548.





Above and below: Tail rotor blade serial number 10549.





Above and below: Tail rotor blade data plates.



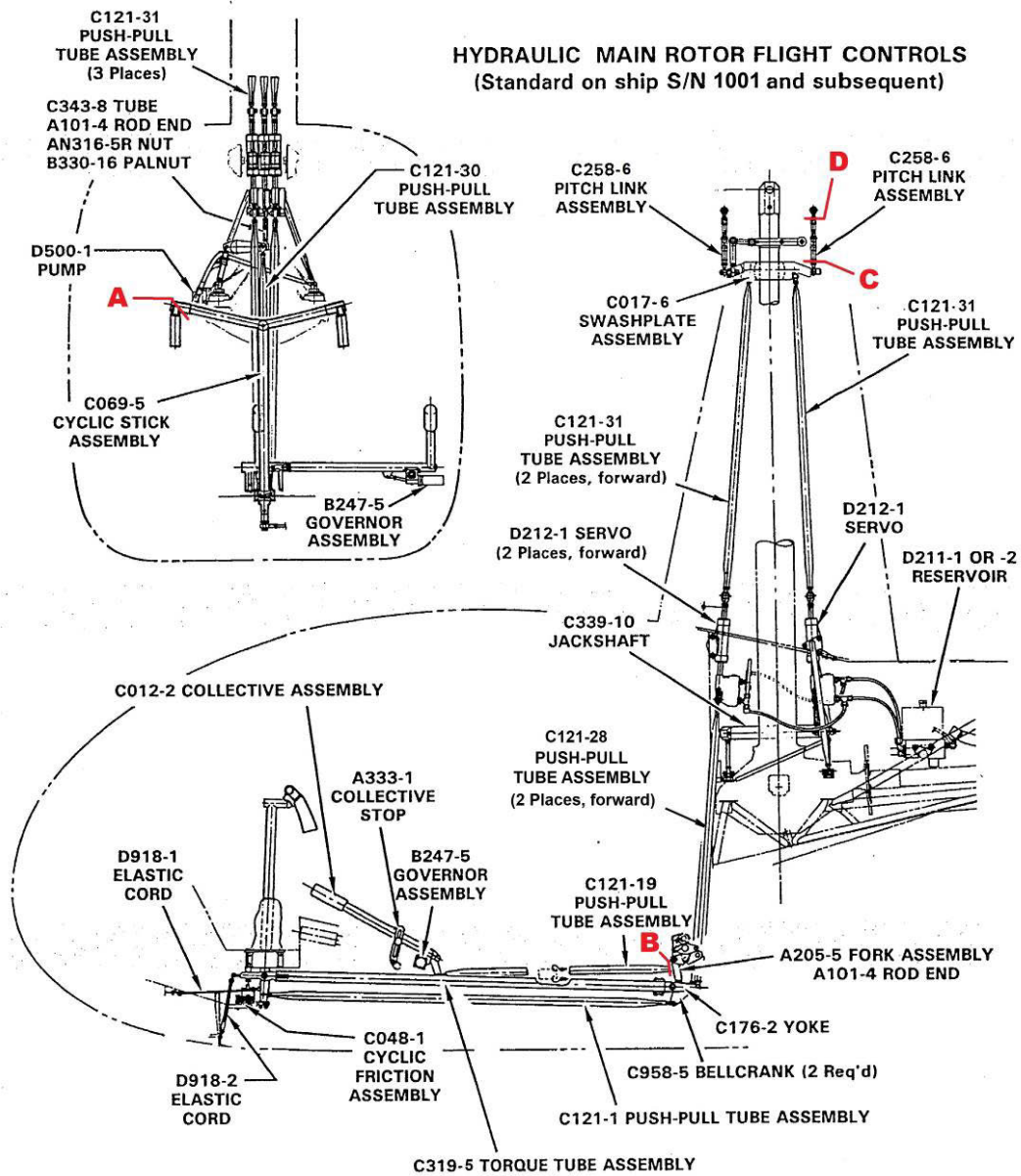
FLIGHT CONTROLS

The flight control system had discontinuities at the locations indicated on the diagrams on pages 12.2 and 12.8. The disconnects are shown individually in the photographs that follow. No evidence of pre-impact failures of the flight control system was found. The center section of pitch link between disconnects C and D was not recovered.

The hydraulic servos were manipulated by hand through their full motion with no anomalies.

The tail rotor pitch change slider was free to slide along the tail rotor gearbox output shaft.

HYDRAULIC MAIN ROTOR FLIGHT CONTROLS (Standard on ship S/N 1001 and subsequent)





Above and below: Disconnect A in pilot's cyclic grip.

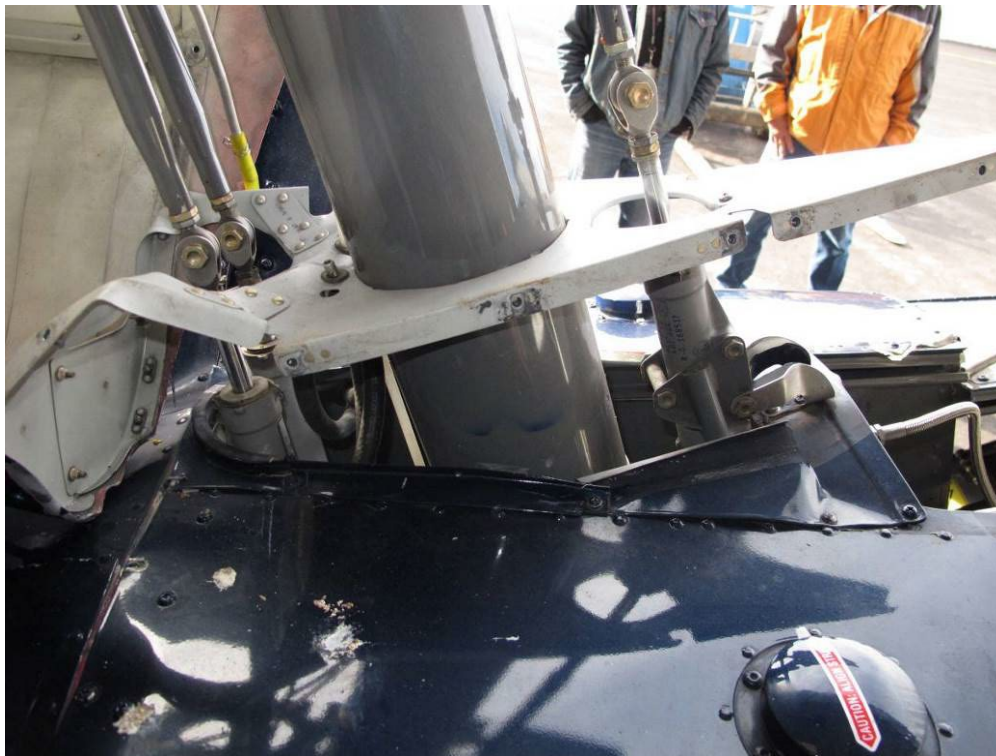




Disconnect B at aft end of C121-19 push pull tube.



Disconnect B at aft end of C121-19 push pull tube.



D212-1 hydraulic servos.



C121-31 push pull tubes.



Swashplate forward control attachments.



Swashplate aft control attachment.



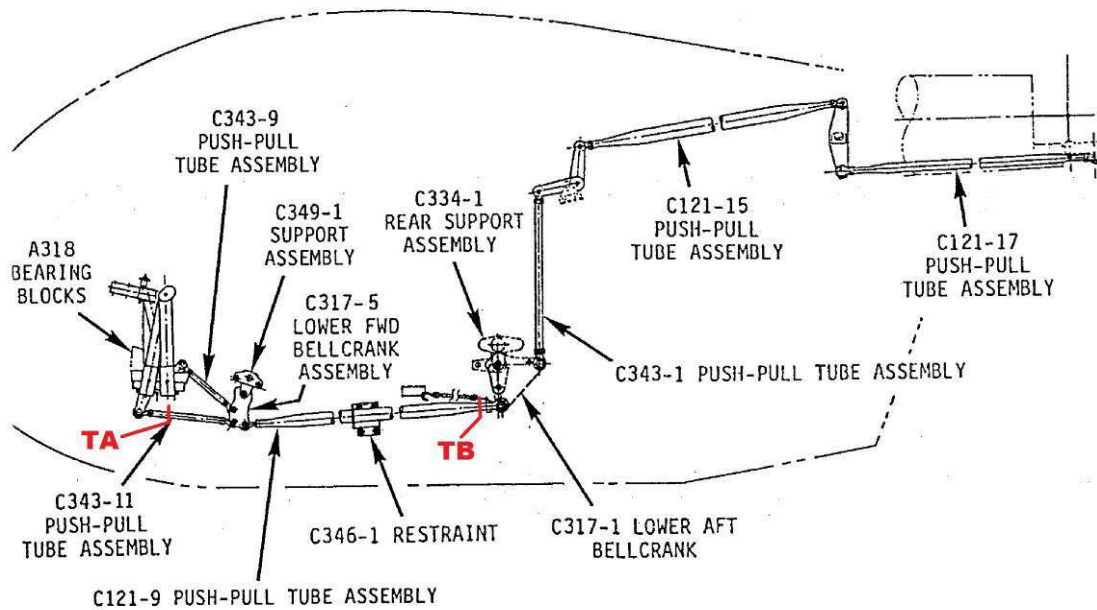
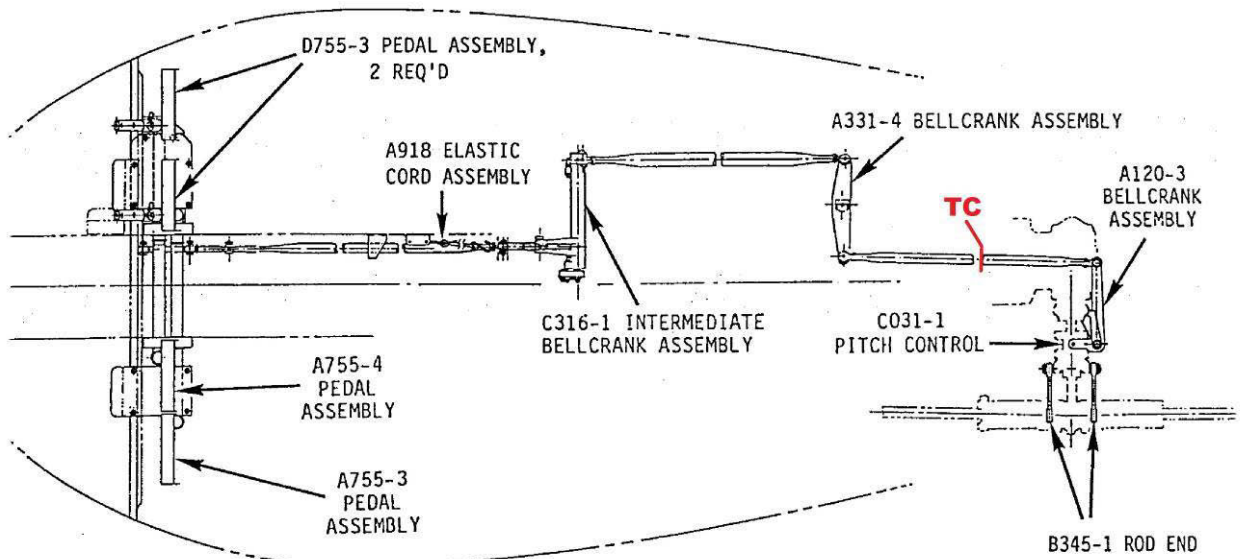
Disconnect C in lower rod end of C258-6 pitch link.



Disconnect D in upper rod end of C258-6 pitch link.



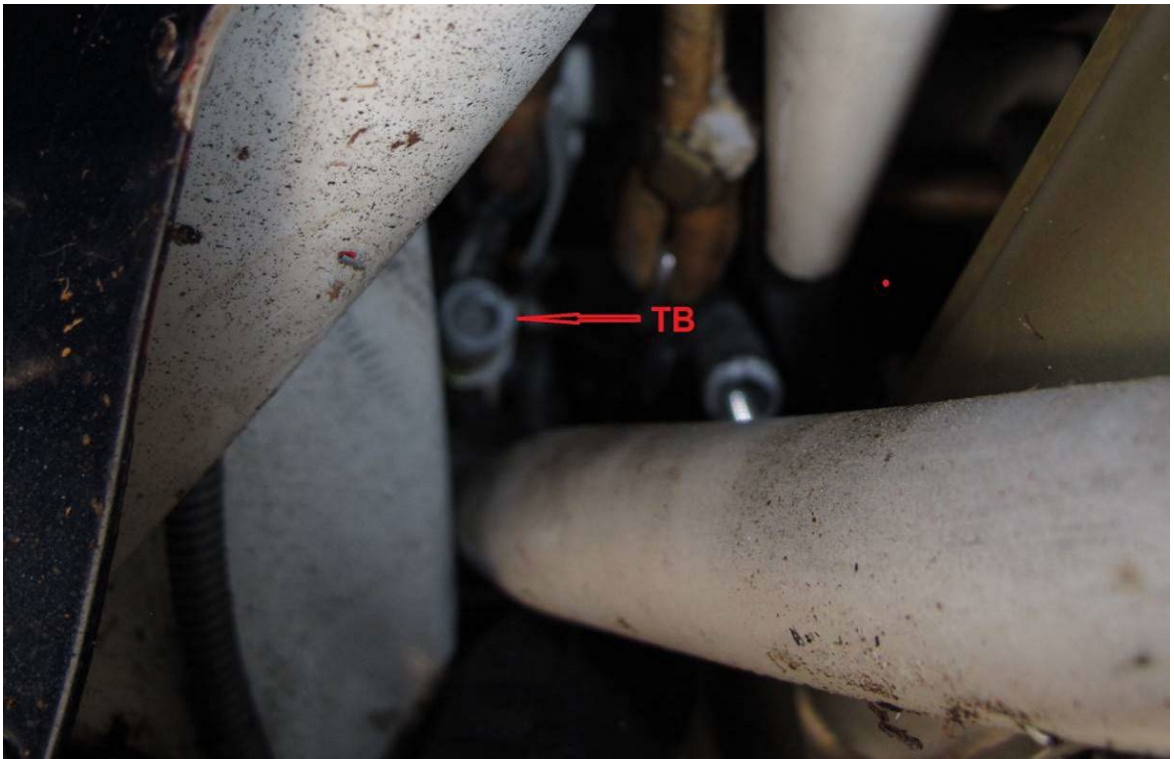
Opposite C258-6 pitch link.





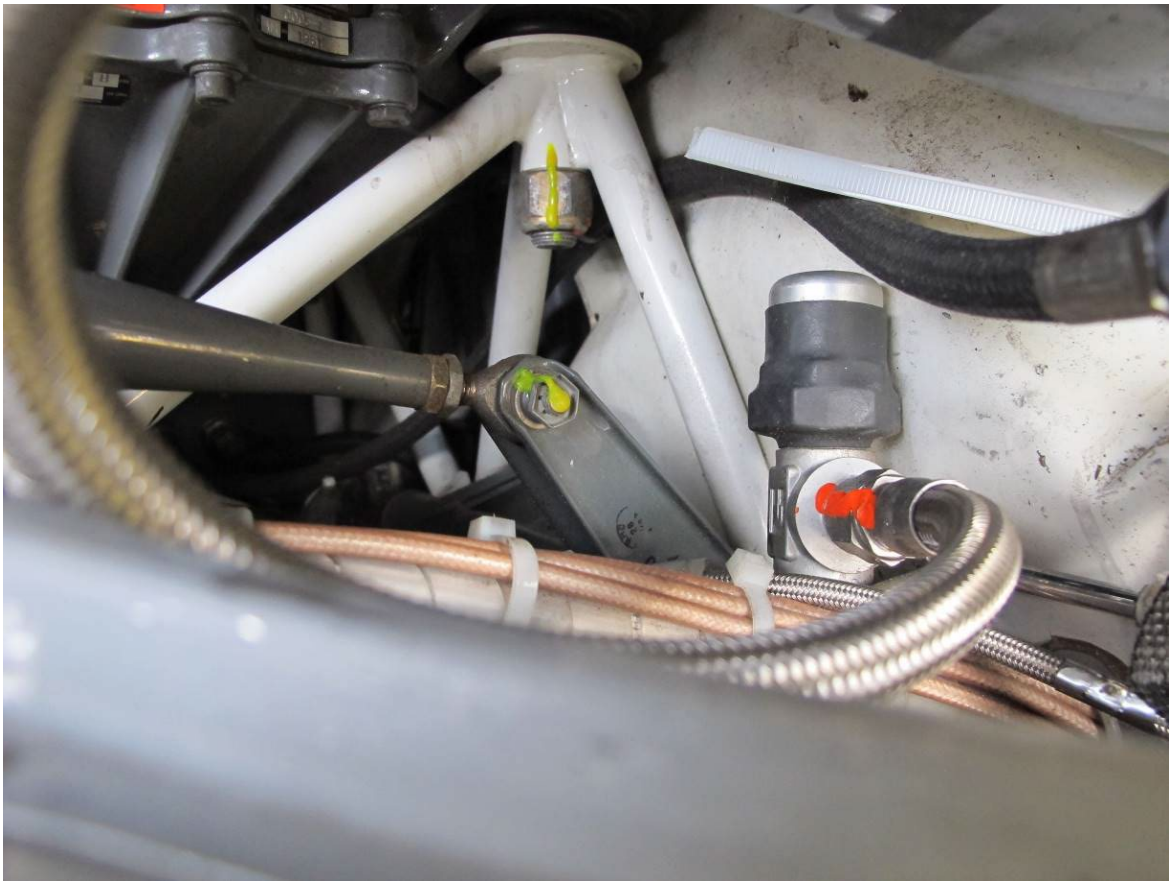
Above and below: Disconnect TA at forward end of C343-11 push pull tube.





Above and below: Disconnect TB at aft end of C121-9 push pull tube.





Forward end of C121-15 push pull tube.



Aft end of C121-15 push pull tube.



Forward end of C121-17 push pull tube.



Disconnect TC in forward section of C121-17 push pull tube.



Disconnect TC in aft section of C121-17 push pull tube.



Flight controls at tail rotor gearbox.

AIRFRAME

The fuselage and cowlings sustained impact damage with the belly and chin being deformed upward and aft. The door frames were distorted. Three doors remained attached to the cabin, the aft left door was separated. The windshields were shattered.

The lower frames were bent slightly.

The horizontal and vertical firewalls were distorted and wrinkled.

The upper frame had only slight bending of the lower tubes.

The forward end of the tailcone remained attached to the upper frame. Most of tailcone bay 6 was not located in the debris field although the strobe light and sections of the tail rotor guard were recovered in the immediate area. Tailcone bay 7 was separated from bay 6 at the bulkhead leaving the rivets sheared.

The empennage remained attached to the aft bulkhead. The bulkhead was partially disconnected across the center. The surface of the disconnect was rough and matte gray in color. The lower portion of the disconnected bulkhead was partially separated from bay 7. The lower vertical stabilizer was bent and folded up to the left with multiple dents and creases on the leading and trailing edges. The upper vertical and horizontal stabilizers had minor dents to their leading and trailing edges.



Right side of fuselage.



Left side of fuselage.



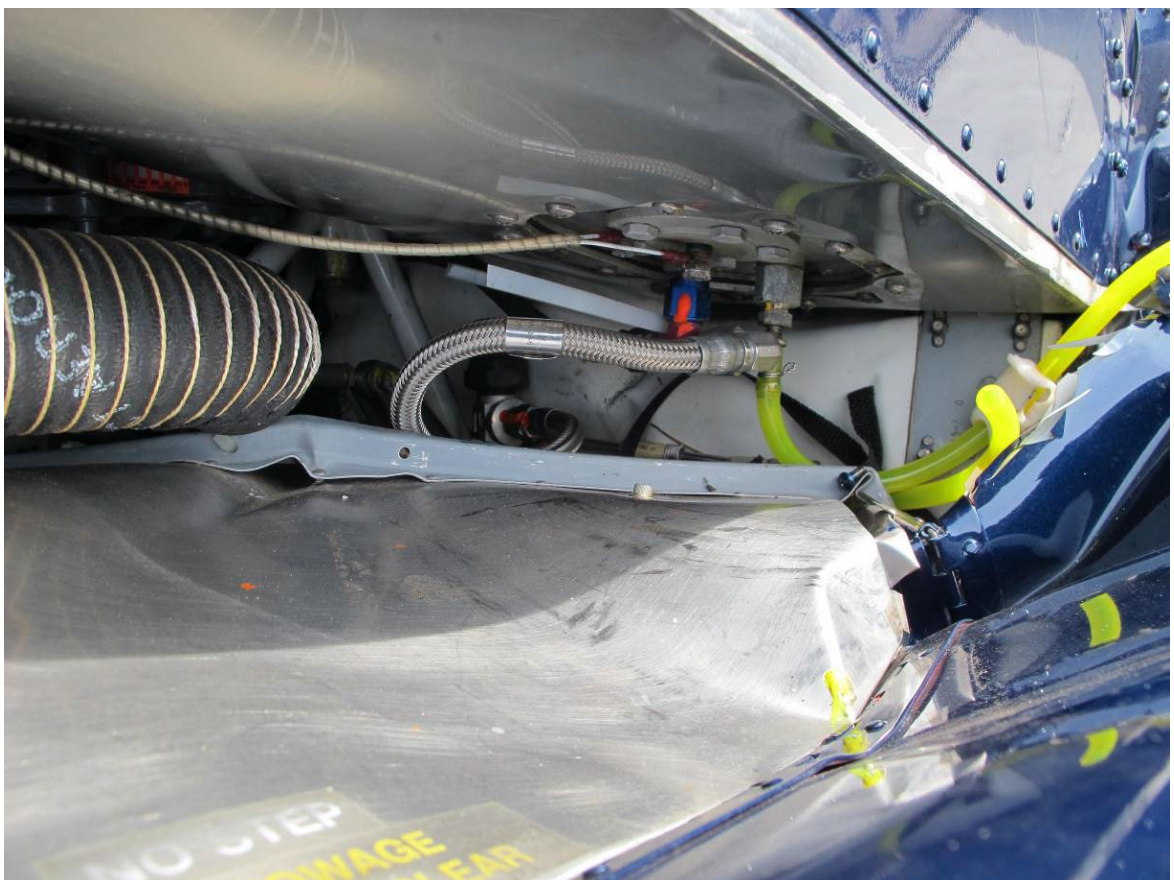
Lower left frame.

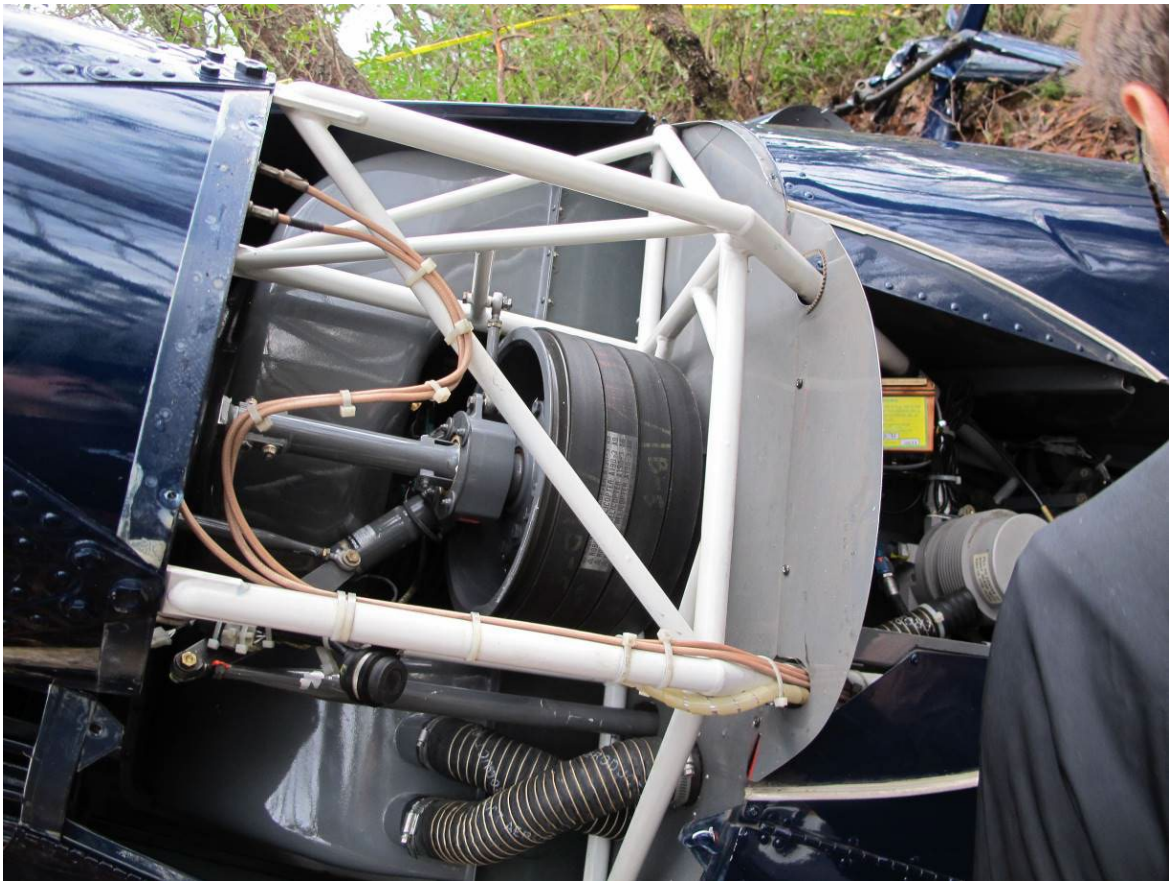


Lower right frame.



Above and below: Horizontal firewall.





Upper frame.



Left side door frame and cabin structure.



Left front door.



Left rear door.



Above and below: Right side door structure.





Front and rear right side doors.



Windshield and roof structure.



Fuselage belly.



Left side cowling.



Aft cowling.



Right side cowling.



Upper left side of tailcone.



Lower right side of tailcone.



Separation between tailcone bays 5 and 6.



Separation between tailcone bays 6 and 7.



Strobe light.



Section of tail rotor guard.



Above and below: Tailcone bay 7 and empennage.





Separation between tailcone bay 7 and aft bulkhead casting.



Lower vertical stabilizer.



Upper vertical stabilizer.



Horizontal stabilizer.



Airframe data plate.

LANDING GEAR

The forward cross tube was straight and remained in place although both elbow mounts were bent/deformed rotating the struts rearward 30-40°.

The left skid was disconnected at both strut mounts.

The aft cross tube was folded slightly aft and upward at the right elbow. Both elbows were separated from their mounts. Both elbows remained secure on the cross tube.

The right skid was disconnected at the forward strut and partially disconnect at the aft strut. The toe section of the right skid was not recovered.



Front cross tube panel and elbows.



Front left strut.



Disconnect in left skid at front strut.



Left skid.



Aft left strut.



Aft left strut and aft cross tube.



Aft cross tube.



Aft right strut.



Aft right strut and right skid.



Front right strut.