

Aircraft Accident/Incident report No.: 160917

Date of Accident: September 17, 2016

Location: Broadus, MT

NTSB File No.: WPR16FA182

Aircraft: Beechcraft 95-B55 (T42A)

Registration No.: N413D

Serial No.: TC-1726 (Year of Manufacture 1974)

Owner/Operator: Per FAA Registration Database:
Tropical Isle Resort Inc.
[REDACTED]
Marathon, FL 33050-3140

Written by: Les Doud
Air Safety Investigator

Date: February 23, 2017

Contents:	Page
Accident Synopsis.....	2
Summary and Analysis of Findings.....	3
Conclusion	3
Propeller Teardown Report.....	4
Left Propeller	5
Right Propeller.....	16
Photographic Summary	27

ACCIDENT SYNOPSIS:

Aircraft Damage: Destroyed
Injuries: Three onboard; three fatal

The following is from the NTSB Preliminary Report:

"On September 17, 2016, about 1300 mountain daylight time, a twin-engine Beech (Baron) 95-B55 airplane, N413D, impacted terrain about 20 miles east of Broadus, Montana. The owner/Airline Transport Pilot operated the airplane under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. The pilot and two passengers were fatally injured, and the airplane sustained substantial damage. The flight departed from the Billings Logan International Airport (BIL), Billings, Montana, about noon, with an intended destination of Rapid City Regional Airport (RAP), Rapid City, South Dakota.

The airplane wreckage was found by a ranch caretaker as he was returning to work from lunch, about 1300. The caretaker reported hearing an airplane during lunch, but he did not go outside to look for it nor did he hear the airplane impact the ground.

A National Transportation Safety Board (NTSB) investigator, A Federal Aviation Administration (FAA) inspector, and a representative from Textron Aviation, the airplane manufacturer, responded to the accident site. The airplane came to rest on a 143-degree magnetic heading on flat land. The main wreckage was confined to the impact area, with all major components identified at the accident site. The airplane's control surfaces remained attached; the left propeller had separated from the left engine and was located just forward of the main wreckage. The right propeller separated and was located underneath the right side cabin fuselage. The nose landing gear was retracted, and pushed up and aft into the cabin where it impacted the front carry through spar.

Both the left and right wing bladder fuel tanks had been breached; however, the smell of 100 low-lead fuel was evident. Both the left and right wings were canted forward, with both engines partially separated from their respective wings. The left propeller blades had light chord wise scratches. The right propeller blades had no chord wise striations.

The airplane was recovered and is in a secured storage facility."

Onsite photos taken by the Textron Air Safety Investigator and NTSB Investigator show the aircraft impacted in a nose low attitude, with characteristics of a vertical trajectory and spinning to the right (left wing leading edge crushed, left fuselage side buckling/empennage displaced left). The terrain appeared to be relatively rock-free hard pan dirt covered by tall prairie grass.

SUMMARY AND ANALYSIS OF FINDINGS

Both the left and right propellers impacted the ground in a near-vertical attitude and separated from their respective engines. The propeller damage on both propellers was similar; one blade on each propeller exhibited chordwise/rotational abrasion (L2 and R1); the majority of abrasion on the camber side but also some on the face side leading edge area. The hydraulic unit/cylinder on each propeller was fractured off the propeller assembly and the pitch change rod was bent. The preload plate opposite each blade with chordwise abrasion exhibited the most prominent pitch change knob mark near the high end of the normal operating range. Both blades that exhibited chordwise/rotational abrasion had fractured pitch change knobs (L2 and R1). The R1 blade bearings were fractured on the camber side of the blade with deep ball imprints.

Additionally, each propeller was coated with oily dirt and grass suggesting a measurable amount of oil in the propeller cylinder at the time of impact which would not be present if the propellers were feathered.

CONCLUSIONS

The physical damage to both propellers indicates rotation with power ON at time of impact. The damage and blade angle impact marks suggest power was in the low range of operation. The type of damage, angle of impact and the type of soil impacted all suggest sudden stoppage (less than one revolution) during the impact sequence. There were no discrepancies noted that would degrade or prevent normal operation. All damage was consistent with high impact forces.

Propeller Teardown Report**Date of Investigation:** October 25-26, 2016**Location:** Storage facility of Arlin's Aircraft Service
Belgrade, MT

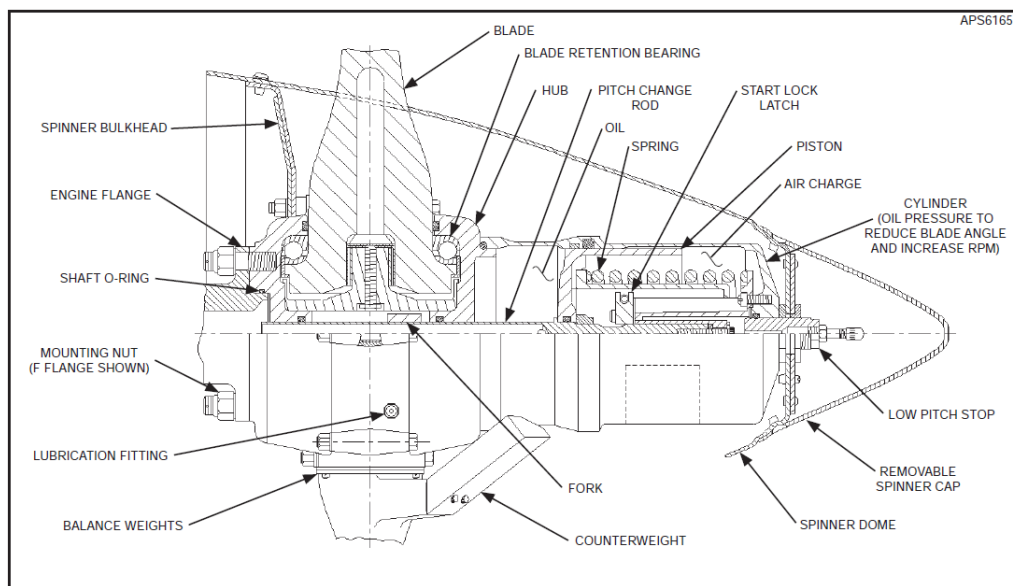
Representatives:	Les Doud	Hartzell Propeller Inc.
	Tealeye Cornejo	NTSB Investigator in Charge
	Kristi Dunks	NTSB Sr. Air Safety Analyst
	Cliff Carpenter	FAA Helena FSDO ASI
	Nicole Charnnon	Continental Motors ASI
	Ernie Hall	Textron ASI

General Comments:

The BHC-C2YF-2CHUF/FC8465B-6 propeller is a 2-blade single-acting, hydraulically operated, constant speed model with feathering capability. Oil pressure from the propeller governor is used to move the blades to the low pitch (blade angle) direction. A spring, counterweights, and an air charge move the blades to the high pitch/feather direction in the absence of governor oil pressure. The propeller incorporates start locks to keep propeller blade angle low to minimize the starting torque. The blades and hub are of aluminum construction. This model propeller also incorporates fluid anti-ice hardware including a slinger ring, travel tubes and anti-ice boots to distribute anti-ice fluid. Propeller rotation is clockwise as viewed from the rear.

Installation Data: Refer to Hartzell Propeller Installation Data Sheet No. 230.
(Data reference the 30-inch radius).

Low Pitch:	16.0 ± 0.1 degrees
Start lock:	21.5 ± 1.5 degrees
Feather:	80.0 ± 1.0 degrees



Cutaway of -2 Series Constant Speed, Feathering Propeller ()HC-()Y(-)2

Position: LEFT

Propeller Model: BHC-C2YF-2CHUF with FC8465B-6 blades

Propeller Assembly Serial Number: AN7337B

Service History: The propeller logbooks were not available at the time this examination was conducted, therefore propeller Total Time Since New (TTSN) and Time Since Overhaul (TSO) information was not available. The propeller blade pitch change knob appeared to be shot peened which suggests the propeller was overhauled sometime after 2003. Blade F7127 had a decal from H&S Propeller documenting an inspection on 6/3/2011.

	<u>S/N</u>	<u>Date of Manufacture</u>	<u>TTSN</u>	<u>TSO</u>
Hub/Factory	A49458B	2/25/2000	UNK	UNK
Blade 1	F7127	12/17/81	UNK	UNK
Blade 2	F7121	12/17/81	UNK	UNK

Blade Orientation:

The blades were arbitrarily identified L1-L2 clockwise as viewed from the rear of the propeller. The hub serial number was between the L1 and L2 blades.

In-situ Condition: See Photos #1 through #4. The left propeller separated from the left engine and was found forward and to the left of the main wreckage. The engine crankshaft propeller flange remained attached to the separated propeller. The propeller hydraulic unit (cylinder, piston, feathering spring) was found embedded in the soil in a vertical orientation (front pointing down), forward of the left horizontal stabilizer, adjacent to a line formed by wing ground scars. Based on the wing ground scar, the aircraft continued rotation to the right and moved forward after the initial impact.

As Received Condition: The left propeller was recovered from the crash site and presented for examination in the condition shown in Photo #5. Both blades were bent aft in varying amounts and appeared to be in a normal operating range of blade angles; they were not in a feathered position. One blade exhibited chordwise/rotational abrasion. One blade (L2) could be rotated by hand, the other could not be rotated. The hydraulic unit fractured from the propeller hub. The pitch change rod had fractured aft of the piston and was bent toward one of the blades. The spinner dome was crushed and torn open. The assembly in and around the hub area was wet with oily dirt and grass.

Spinner Dome: The spinner dome was crushed and torn but the majority was still attached to the spinner bulkhead flange via screws. A portion of the spinner dome was formed around the hydraulic unit and torn from the rest of the spinner. The remaining part of the dome was torn essentially in half and crushed/compressed to either side of the propeller assembly, exposing the front of the propeller hub.

Spinner Bulkhead: The spinner bulkhead was torn and bent aft. The anti-ice slinger ring was still attached to the bulkhead but was also bent.

Propeller Cycling: The propeller cycling was not possible due to impact damage.

Engine/Propeller Mounting: The engine crankshaft fractured and the engine flange was still attached to the propeller with five of six mounting studs. One mounting stud fractured nearly flush with the propeller hub; a portion of the crankshaft flange adjacent to the fractured stud was also fractured and not recovered. The remaining five stud/nuts were tight but the torque was not measured.

Cylinder: The cylinder fractured from the hub as part of the hydraulic unit. The cylinder fractured into several pieces aft of the piston O-ring groove and was exposing the majority of the piston (see Photo #6). The air valve had fractured off the low pitch stop assembly and was missing, presumed not recovered from the crash site.

Piston: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the piston was not removed. The piston remained in the cylinder, presumably retained by the start locks. There was one visible dent on the aft corner of the piston.

Pitch Change Rod: The pitch change rod bent and fractured just aft of the piston attachment. The bent portion remained in the forward hub half. There were scuff marks on the rod near the front end caused by rubbing in the fwd hub boss (see Photo #8); the rub marks represent a forward fork/low blade angle position.

Fork: The fork was removed/unthreaded from the pitch change rod for examination and appeared undamaged.

Spring/Spring Guides: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the spring, spring guides and spring retaining cup were not removed or examined.

Pitch Stops:

Low Pitch Stop: The low pitch stop was not removed from the cylinder and thus not inspected.

Feather Stop and Start Locks: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the feather stop and start locks were not removed or examined.

Hub Assembly: The hub unit was a D-6530-5 Rev. E unit that had been installed new as part of the propeller sometime in 2000. When the hub unit was opened, there was a moderate amount of what appeared to be fresh grease in the hub cavity, indicating overservicing. The cylinder mounting boss threads were fractured leaving a visible crack around a segment of the boss; the O-ring in that segment was cut and missing (Photo #9). The preload plate surfaces for both blades had damage on the front (camber) and aft (face) sides. The preload plate shelf of the L1 blade pocket had noticeable damage on the lead edge/face quadrant (Photo #10). There was a blade paint transfer mark in the aft/face quadrant of the L2 blade aperture (Photo #7). There was no other major, visible damage to the exterior surfaces of the hub.

Preload Plates: See Photo #11

NOTE: For this propeller model, when the blade knob is aligned with the hub parting line, the blade angle at the reference station is approximately 50° (knob 14° + 36° = 50°).

L1 preload plate had knob block impact marks at 5° and 37° forward of the hub parting line that suggest blade L1 was at approximately 45° and 13° respectively. There was lip deformation in both the lead/camber and face/trail quadrants.

L2 preload plate had the lip sheared off in one piece. There were hub impact marks on the lead and trail edge corners. There was a discernable knob block bumper swipe mark starting at approximately 25° forward of the hub parting line. There was also a gouge coming out of the preload screw counterbore in the forward direction.

Propeller Blade Properties: Photos #12 through #16

Blade # L1

Camber side	Not remarkable, normal abrasion appearance
Face side	Not remarkable, normal abrasion appearance
Bend	Aft
Twist	Not remarkable
Lead edge damage	Not remarkable
Trail edge damage	Not remarkable
Knob condition	Appears intact, knob block intact, plastic busing partially broken
Counterweight	Intact but removed to facilitate hub disassembly and blade removal
Blade bearings	Intact
Butt/shank impact marks	Not remarkable
Anit-Ice boot	Intact with small tears and nicks

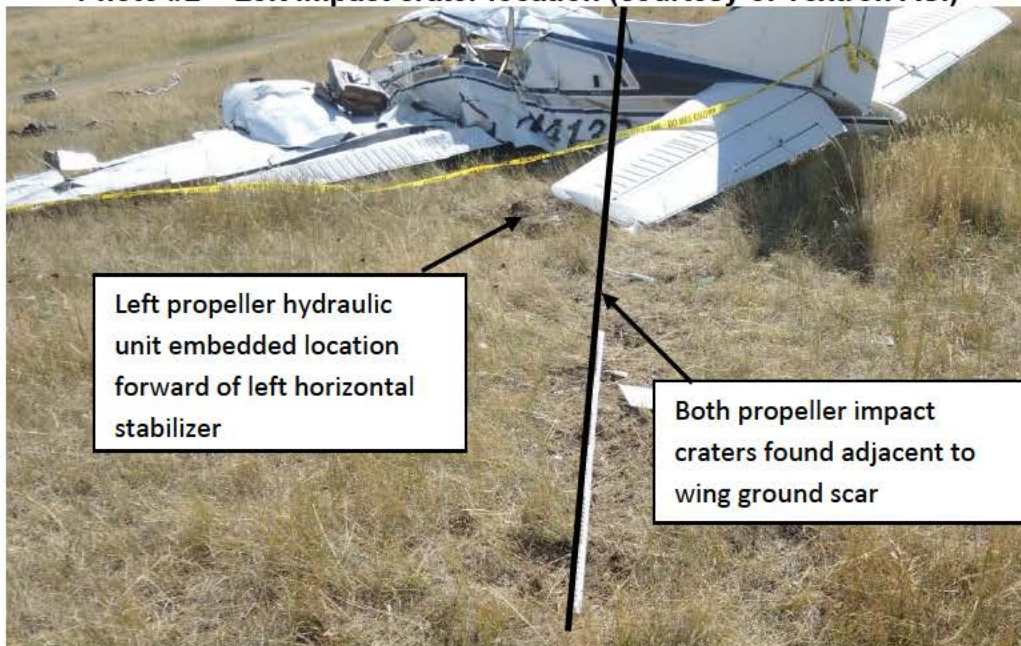
Blade # L2

Camber side	Chordwise/rotational abrasion back to approximately 50%c
Face side	Abrasion 0.5" aft of leading edge (more severe than normal abrasion like on L1)
Bend	Aft
Twist	Leading edge down
Lead edge damage	Not remarkable
Trail edge damage	Not remarkable
Knob condition	Fractured opposite low pitch, knob block cracked and bumper skirt fractured. The knob had an impact/cut mark from the preload plate slot.
Counterweight	Intact but removed to facilitate hub disassembly and blade removal
Blade bearings	Intact but the bearing retention lip on the shank was fractured. The bearing retention ring was intact holding the bearing races and fractured portion of the retention lip.
Butt/shank impact marks	There was a paint transfer mark on the trail edge side above the Teflon O-ring rub strip (Photo #)
Anit-Ice boot	Intact with small tears and nicks

Photo #1 – Left propeller in situ (courtesy of NTSB ASI)



Photo #2 – Left impact crater location (courtesy of Textron ASI)



**Photo #3 – Left propeller impact crater location, hydraulic unit embedded
(courtesy of NTSB ASI)**



**Photo #4 – Left propeller impact crater location, hydraulic unit dug out
(courtesy of NTSB ASI)**

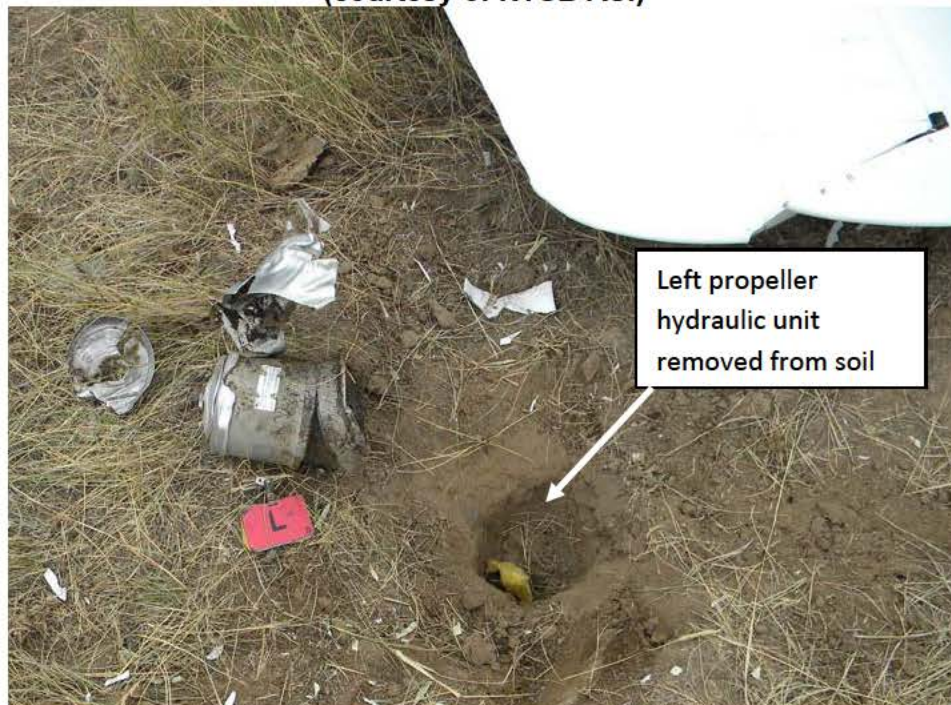


Photo #5 – Left propeller as-presented for examination



Photo #6 – Left propeller hydraulic unit



Photo #7 – Left hub L2 blade pocket damage and paint transfer mark



Photo #8 – Left hub L2 blade pocket damage (fwd side) and pitch change rod scuff marks



Photo #9 – Left hub cylinder mounting boss fracture



Photo #10 – Left hub L1 blade pocket damage



Photo #11 – Left preload plates



Photo #12 – Left blades camber side



Aircraft Accident/Incident report No.: 160917

Photo #13 – Left blades face side



Photo #14 – Left blades leading edge view



Photo #15 – L2 paint transfer mark and bearing retention lip fracture



Photo #16 – L2 camber side chordwise/rotational abrasion



Position: RIGHT

Propeller Model: BHC-C2YF-2CHUF with FC8465B-6 blades

Propeller Assembly Serial Number: JS373B

Service History: The propeller logbooks were not available at the time this examination was conducted, therefore propeller Total Time Since New (TTSN) and Time Since Overhaul (TSO) information was not available. The propeller blade pitch change knob appeared to be shot peened which suggests the propeller was overhauled sometime after 2003. Blade H96799 had a decal from H&S Propeller documenting an inspection on 6/1/2011.

	<u>S/N</u>	<u>Date of Manufacture</u>	<u>TTSN</u>	<u>TSO</u>
Hub/Factory	B6307B	5/20/2011	UNK	UNK
Blade 1	H96798	12/20/1996	UNK	UNK
Blade 2	H96799	12/20/1996	UNK	UNK

Blade Orientation:

The blades were arbitrarily identified R1-R2 clockwise as viewed from the rear of the propeller. The hub serial number was between the R1 and R2 blades.

In-situ Condition: See Photo #16. The right propeller separated from the right engine and was found under the aircraft cabin floor, beneath the right aft seat area. The engine crankshaft propeller flange remained attached to the separated propeller. The propeller was found embedded in the soil in a vertical orientation, adjacent to a line formed by wing ground scars. The spinner was torn and crushed aft.

As Received Condition: The right propeller was recovered from the crash site and presented for examination in the condition shown in Photo #17. One blade (R1) exhibited S-bend characteristics and appeared to be in a normal operating blade angle range; this blade exhibited chordwise/rotational abrasion. The other blade (R2) was bent aft and appeared to be near a feathered position. R1 could be rotated by hand, R2 could not be rotated. The hydraulic unit fractured from the propeller hub but remained loosely attached to the assembly by fragments of the spinner dome that had hydro-formed around the cylinder. The pitch change rod had fractured aft of the piston and was bent toward one of the blades. The spinner dome was crushed and torn open. The assembly in and around the hub area was wet with oily dirt and grass.

Spinner Dome: The spinner dome was crushed and torn but the majority was still attached to the spinner bulkhead flange via screws. A portion of the spinner dome was formed around the hydraulic unit (Photo #19). The dome was torn and crushed/compressed to either side of the propeller assembly, exposing the front sides of the propeller hub.

Spinner Bulkhead: The spinner bulkhead was torn and bent aft. The anti-ice slinger ring was still attached to the bulkhead but was also bent.

Propeller Cycling: The propeller cycling was not possible due to impact damage.

Aircraft Accident/Incident report No.: 160917

Engine/Propeller Mounting: The engine crankshaft fractured and the engine flange was still attached to the propeller with five of six mounting studs. One mounting stud fractured nearly flush with the back side of the engine flange. The remaining five stud/nuts were tight but the torque was not measured. The flange surface exhibited some minor corrosion and fretting.

Cylinder: The hydraulic unit fractured from the hub (Photo #21). The cylinder fractured just forward of the mounting threads; the threaded portion remained on the hub boss (see Photo #22). The air valve had fractured off the low pitch stop assembly and was missing, presumed not recovered from the crash site.

Piston: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the piston was not removed. The piston appeared intact and remained in the cylinder, presumably retained by the start locks.

Pitch Change Rod: The pitch change rod bent and fractured just aft of the piston attachment. The bent portion remained in the forward hub half (Photo #23). The rod also fractured forward of the fork, near the threaded region. The remainder/aft segment of the pitch change rod remained threaded in the fork. There were rub marks on the rod near the aft end caused by rubbing in the aft hub boss (see Photo #20); the rub marks represent a forward fork/low blade angle position.

Fork: The fork was removed with the aft portion of the pitch change rod still attached. The fork appeared intact and undamaged (see Photo #20)

Spring/Spring Guides: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the spring, spring guides and spring retaining cup were not removed or examined.

Pitch Stops:

Low Pitch Stop: The low pitch stop was not removed from the cylinder and thus not inspected.

Feather Stop and Start Locks: Due to damage and no means to safely remove the feathering spring, the hydraulic unit was not disassembled and therefore the feather stop and start locks were not removed or examined.

Hub Assembly: The hub unit was a D-6530-25 Rev. C unit that had been installed new as part of the propeller sometime in 2011. When the hub unit was opened, there was a moderate amount of what appeared to be fresh grease in the hub cavity, indicating overservicing. The cylinder mounting boss appeared intact with the threaded portion of the cylinder still attached. The preload plate surfaces for both blades had damage on the aft (face) sides (Photos #24 and #25). There was no other major, visible damage to the exterior surfaces of the hub.

Preload Plates: See Photo #26

NOTE: For this propeller model, when the blade knob is aligned with the hub parting line, the blade angle at the reference station is approximately 50° (knob 14° + 36° = 50°).

Aircraft Accident/Incident report No.: 160917

R1 preload plate had the lip sheared off approximately 90+% of the circumference. There were no discernable knob block impressions.

R2 preload plate had a knob block impact mark at 14° forward of the hub parting line that suggested blade R2 was at approximately 36°. The lip was sheared approximately 90+% of the circumference.

Propeller Blade Properties: See Photos #28 through #32**Blade # R1**

Camber side	Chordwise/rotational abrasion back to approximately 30%c
Face side	Chordwise/rotational abrasion 0.5" aft of leading edge (more severe than normal abrasion like on R2)
Bend	S-bend
Twist	Leading edge up/untwisted, blade appeared flat with no twist
Lead edge damage	Not remarkable
Trail edge damage	Not remarkable
Knob condition	Fractured opposite low pitch, knob block fractured, plastic bushing debonded and broken. The knob had two impact/cut marks from the preload plate slot.
Counterweight	Intact but removed to facilitate hub disassembly and blade removal
Blade bearings	The hub side bearing races were fractured on either side of the leading edge split line (Photo #27)
Butt/shank impact marks	There was a paint transfer mark on the trail edge side above the Teflon O-ring rub strip (Photo #32)
Anit-Ice boot	Intact

Blade # R2

Camber side	Not remarkable, normal/slight chordwise abrasion appearance
Face side	Not remarkable, normal abrasion appearance
Bend	Aft
Twist	Leading edge up/untwisted, blade appeared flat with no twist
Lead edge damage	Not remarkable
Trail edge damage	Not remarkable
Knob condition	Appears intact bent opposite low pitch, knob block bumper skirt fractured, plastic busing debonded and broken
Counterweight	Intact but removed to facilitate hub disassembly and blade removal
Blade bearings	Intact. The bearing retention lip on the shank was fractured. The bearing retention ring was intact holding the bearing races and fractured portion of the retention lip.
Butt/shank impact marks	There was a paint transfer mark on the trail edge side above the Teflon O-ring rub strip (Photo #32)
Anit-Ice boot	Intact

Photo #17 – Right propeller in situ (courtesy of Textron ASI)



Photo #18 – Right propeller condition as-received



Photo #19 – Right spinner dome hydro-formed around hydraulic unit



Photo #20 – Right fork and pitch change rod segment



Photo #21 – Right hydraulic unit, aft side of piston



Photo #22 – Right hub cylinder attachment area and bent pitch change rod



Photo #23 – Right pitch change rod forward segment and fractured boss



Photo #24 – R2 blade pocket



Photo #25 – R1 blade pocket



Photo #26 – Right preload plates



Photo #27 – R1 hub side bearing race fracture with ball impressions



Photo #28 – Right blades camber side



Aircraft Accident/Incident report No.: 160917

Photo #29 – Right blades face side



Photo #30 – R1 camber side chordwise/rotational abrasion



Photo #31 – Right blades leading edge view



**Photo #32 – Right blades shank trailing edge view
(paint transfer mark and Teflon rub strip damage)**



PHOTOGRAPHIC SUMMARY

NOTE: The following is a list of the original and unedited digital photographs taken by the author. The photographs are available in digital format (CD, memory stick/card, FTP). The numbering sequence may not be chronological as some may have been deleted if out-of-focus, too dark, redundant, etc. Photos used in the text of this report are taken from photos on this list but may have been adjusted from the original. Modifications to images used in the report are limited to cropping, magnification, file compression, or enhancement of color, brightness, or contrast for the sole purpose to improve clarity of the report. No other alterations are permitted.

<u>Picture File Name</u>	<u>Description</u>
DSCN4281.JPG	Right propeller as-received A
DSCN4282.JPG	Right propeller as-received B
DSCN4283.JPG	Right blade R1 (mis-labeled L1) as-received
DSCN4284.JPG	Right propeller as-received (mis-labeled as Left) C
DSCN4285.JPG	Left propeller as-received (mis-labeled as Right) A
DSCN4286.JPG	Left blade L2 (mis-labeled as R2) as-received
DSCN4287.JPG	Right propeller as-received (mis-labeled as Left) D
DSCN4288.JPG	Right propeller as-received (mis-labeled as Left) E
DSCN4289.JPG	Right propeller as-received (dark/unusable photo)
DSCN4290.JPG	Right propeller front end of cylinder/low pitch stop/dome mounting
DSCN4291.JPG	Left propeller as-received (mis-labeled as Right) B
DSCN4292.JPG	Right propeller as-received with blades marked
DSCN4293.JPG	Left propeller as-received C
DSCN4294.JPG	Left propeller hub halves opened
DSCN4295.JPG	Right propeller hub halves opened A
DSCN4296.JPG	Right propeller hub halves opened B
DSCN4297.JPG	R1 blade butt as-removed
DSCN4298.JPG	R1 blade bearing race fragments in hub
DSCN4299.JPG	Left blades camber side
DSCN4300.JPG	Right blades camber side
DSCN4301.JPG	Left blades camber side tip area
DSCN4302.JPG	Right blades camber side tip view
DSCN4303.JPG	R1 camber side tip area
DSCN4304.JPG	L2 camber side tip area
DSCN4305.JPG	Right propeller crankshaft flange fracture surface
DSCN4306.JPG	Left propeller crankshaft flange fracture surface
DSCN4307.JPG	Left blades face side
DSCN4308.JPG	Right blades face side
DSCN4309.JPG	R1 blade butt A
DSCN4310.JPG	R1 blade butt B
DSCN4311.JPG	R2 blade butt
DSCN4312.JPG	L1 blade butt
DSCN4313.JPG	L2 blade butt
DSCN4314.JPG	Left preload plates A
DSCN4315.JPG	Right preload plates
DSCN4316.JPG	L2 preload plate A

Aircraft Accident/Incident report No.: 160917

DSCN4317.JPG	L2 preload plate B
DSCN4318.JPG	R1 fractured pitch change knob and block
DSCN4319.JPG	R2 pitch change block fragments
DSCN4320.JPG	R1 fractured fwd. side bearing races A
DSCN4321.JPG	R1 fractured fwd. side bearing races B
DSCN4322.JPG	Right fractured pitch change rod and fork
DSCN4323.JPG	Right cylinder assembly/piston aft side with crushed spinner dome A
DSCN4324.JPG	Right cylinder assembly/piston aft side with crushed spinner dome B
DSCN4325.JPG	Right hub unit with cylinder base fragment damage
DSCN4326.JPG	Right hub fwd. side showing fractured pitch change rod portion and boss
DSCN4327.JPG	R1 blade pocket aft side damage
DSCN4328.JPG	R2 blade pocket aft side damage
DSCN4329.JPG	Right mounting flange/studs and dowel pins A
DSCN4330.JPG	Right mounting flange/studs and dowel pins B
DSCN4331.JPG	Right misc. hardware bag
DSCN4332.JPG	R1 and R2 blade retention bearings and counterweights
DSCN4333.JPG	Left fork
DSCN4334.JPG	Left preload plates B
DSCN4335.JPG	Left cylinder and spinner dome A
DSCN4336.JPG	Left cylinder/piston
DSCN4337.JPG	Left cylinder and spinner dome B
DSCN4338.JPG	Left misc. hardware bag
DSCN4339.JPG	L2 blade bearing retention ring/lip fracture
DSCN4340.JPG	L1 blade retention pocket aft side A
DSCN4341.JPG	L1 blade retention pocket fwd. side A
DSCN4342.JPG	L2 blade retention pocket fwd. side A
DSCN4343.JPG	L2 blade retention pocket fwd. side B
DSCN4344.JPG	L2 blade retention pocket aft side
DSCN4345.JPG	L1 blade retention pocket aft side B
DSCN4346.JPG	L1 blade retention pocket fwd. side B
DSCN4347.JPG	L1 blade retention pocket fwd. side C
DSCN4348.JPG	Left hub cylinder mounting thread/boss crack A
DSCN4349.JPG	Left hub cylinder mounting thread/boss crack B
DSCN4350.JPG	Left hub cylinder mounting thread/boss crack C
DSCN4351.JPG	Left propeller mounting flange
DSCN4352.JPG	Left blade retention hardware and counterweight
DSCN4353.JPG	Right blades face side tip area A
DSCN4354.JPG	L2 blade face side tip area
DSCN4355.JPG	Left blades face side tip area
DSCN4356.JPG	Right blades face side tip area B
DSCN4357.JPG	Right blades shank trailing edge hub impact marks A
DSCN4358.JPG	Right blades shank trailing edge hub impact marks B
DSCN4359.JPG	Left blade shanks trailing edge area
DSCN4360.JPG	Right blades leading edge view
DSCN4361.JPG	Right blades leading edge/face side view
DSCN4362.JPG	Left blades leading edge view A
DSCN4363.JPG	Left blades leading edge view B