



# Aviation Investigation Final Report

<b>Location:</b>	Unadilla, Georgia	<b>Accident Number:</b>	NYC08LA015
<b>Date &amp; Time:</b>	October 20, 2007, 10:00 Local	<b>Registration:</b>	N780SR
<b>Aircraft:</b>	Ryan ST-3KR	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot was flying the recently-acquired airplane on a cross-country flight. During the descent for landing, the engine shook violently followed by the wooden propeller blades separating at the hub. The pilot landed the airplane in a field, resulting in substantial damage. The previous owner had the propeller replaced with an older one prior to delivery of the airplane, stating that he did not want the new owner to "ding up the expensive new prop." Examination of the remaining hub and attachment bolt revealed evidence of fatigue failure due to excessive looseness of the attachment bolts. The mechanic who replaced the propeller did not adequately document its replacement. Reportedly, the propeller that failed had been in storage for 30 years, and showed evidence of gray staining deep into the wood, indicative of significant moisture penetration over an extended period of time.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The improper propeller installation by the mechanic.

### Findings

Occurrence #1: PROPELLER FAILURE/MALFUNCTION  
Phase of Operation: DESCENT

#### Findings

1. PROPELLER SYSTEM/ACCESSORIES, BLADE - SEPARATION

2. (C) MAINTENANCE, INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL

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Occurrence #2: FORCED LANDING

Phase of Operation: DESCENT - EMERGENCY

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Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER

Phase of Operation: LANDING - ROLL

Findings

3. TERRAIN CONDITION - DIRT BANK/RISING EMBANKMENT

## Factual Information

On October 20, 2007, at approximately 1000 eastern daylight time, a Ryan ST-3KR, N780SR, was substantially damaged during a forced landing near Unadilla, Georgia, after the propeller separated from the airplane. The certificated commercial pilot was not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which departed Cook County Airport (15J), Adel, Georgia, destined for Perry-Houston County Airport (PXE), Perry, Georgia. The personal flight was conducted under the provisions of 14 Code of Federal Regulations (CFR) Part 91.

According to the pilot, he had recently purchased the airplane in Winter Garden, Florida, and had partially completed a multiple leg trip, which would terminate in Nashville, Tennessee. At approximately 0845 on the day of the accident, the pilot started the airplane and after completing his run-up, departed 15J. Upon reaching his cruising altitude of 2,500 feet mean sea level (msl), he turned directly for PXE.

The flight was uneventful for the first 75 minutes of flight. At approximately 0955, the pilot initiated a descent to 1,500 feet msl in preparation for landing at PXE. Approximately 5 minutes later the airplane began to shake "violently," and after approximately 10 seconds, the propeller "flew apart." The pilot then reduced power to idle and shut off the mixture control in order to keep the engine from separating from the airplane. He then determined that the best available place to land was an open hay field that was off to his left side, and began to maneuver for landing.

Just prior to landing, a "large amount" of oil was released from the engine area that covered the pilot. After touching down in the field, the pilot applied heavy braking. As the airplane approached a road with a built-up shoulder, the pilot applied full right brake and the airplane turned to the right and stopped.

The recorded weather at Robins Air Force Base (WRB), Warner Robins, Georgia, located 24 miles northeast of the accident site, at 0955, included winds from 330 degrees at 5 knots, 10 statute miles visibility, clear skies, temperature 17 degrees Celsius (C), dew point 13 degrees C, and an altimeter setting of 30.05 inches of mercury.

According to FAA records, the pilot held a commercial pilot certificate with ratings for airplane single-engine land and airplane multi-engine land. His most recent FAA third-class medical certificate was issued on May 11, 2007. He reported 4,100 total hours of flight experience.

Examination of the wreckage by a Federal Aviation Administration (FAA) inspector revealed that the propeller mounting bolts were damaged, and that only a small amount of material from the wooden propeller remained attached to the propeller hub. The engine had partially

separated from the firewall, and the firewall was damaged. The engine's lubrication and fuel system hoses were damaged, and the landing gear and fuselage both were twisted.

According to both FAA and maintenance records, the airplane was manufactured in 1942. The airplane's most recent annual inspection was completed on August 5, 2007. At the time of the inspection, the airplane had accrued 3,457.2 total hours of operation, and the engine had accrued 380 hours of operation since its last overhaul.

Portions of the wooden propeller and hub were sent to the National Transportation Safety Board Materials Laboratory for examination. According to the Materials Laboratory Factual Report, "the four attachment holes...were blackened and charred, [consistent with] significant friction between them and their attachment bolts...and therefore the propeller [was] loose." There was also "gray staining that had penetrated deep into the grain of the wood...normally associated with the ingress of moisture over a significant period of time." The fracture surface of the mounting bolt contained a zone area typical of fatigue, whereas the other zone was typical of overload.

An FAA inspector contacted the mechanic who had worked on the airplane. He stated that he had installed "a different propeller and hub assembly" at the previous owner's request "so that [the new owner] would not ding up the expensive good prop." The mechanic added that "the propeller was supplied with the hub already installed and that all he had to do was install the hub and propeller on the crankshaft and torque the barrel nut to 250 foot pounds with an 8-foot breaker bar." The mechanic said he did not make any logbook entry and did not have any other installation documentation other than a repair invoice. The following was written on that repair invoice: "Removed newer prop. Installed original prop owner furnished. Hub was installed and safetyed (sic). I installed master nut and torqued to specs. Aircraft was flown for two hours at our field before leaving with new owner."

The following are excerpts taken from the airframe logbook:

11/1/84, 3186.5, Replace propeller with new Sensenich  
5/12/86, 3236.5, Exchange Famlin propeller for Sensenich propeller SN #AA5939  
1/1/87, Removed and replaced prop  
3/27/99, Installed (unreadable) prop, TQW nut to proper spec

The propeller that failed had been in storage for approximately 30 years.

## Pilot Information

<b>Certificate:</b>	Commercial; Military	<b>Age:</b>	48
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	May 11, 2007
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	October 12, 2007
<b>Flight Time:</b>	4100 hours (Total, all aircraft), 7 hours (Total, this make and model), 4000 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Ryan	<b>Registration:</b>	N780SR
<b>Model/Series:</b>	ST-3KR	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	2007
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	August 5, 2007 Annual	<b>Certified Max Gross Wt.:</b>	1860 lbs
<b>Time Since Last Inspection:</b>	10 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	3457 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Kinner
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	R-56
<b>Registered Owner:</b>	Joseph Mark Ford	<b>Rated Power:</b>	160 Horsepower
<b>Operator:</b>	Joseph Mark Ford	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	WRB,294 ft msl	<b>Distance from Accident Site:</b>	24 Nautical Miles
<b>Observation Time:</b>	09:55 Local	<b>Direction from Accident Site:</b>	45°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	330°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.04 inches Hg	<b>Temperature/Dew Point:</b>	17°C / 13°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Adel, GA (15J )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Perry, GA (PXE )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	08:45 Local	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 None	<b>Latitude, Longitude:</b>	32.249542,-83.7304(est)

## Administrative Information

**Investigator In Charge (IIC):** Hicks, Ralph  
**Additional Participating Persons:** Eric Pisz; FAA/FSDO; Atlanta, GA

**Original Publish Date:** December 24, 2008

**Last Revision Date:**

**Investigation Class:** [Class](#)

**Note:**

**Investigation Docket:** <https://data.ntsb.gov/Docket?ProjectID=66941>

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