



# National Transportation Safety Board Aviation Accident Final Report

---

<b>Location:</b>	CHERRY POINT, NC	<b>Accident Number:</b>	ATL01LA043
<b>Date &amp; Time:</b>	04/01/2001, 1400 EDT	<b>Registration:</b>	N78321
<b>Aircraft:</b>	Globe GC1B	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 None

**Flight Conducted Under:** Part 91: General Aviation - Air Race/Show

---

## Analysis

A Globe GC1B lost a propeller blade in-flight while maneuvering in the number two position of a formation of three airplanes, a propeller blade separated from the propeller hub assembly. The second propeller blade, along with the hub assembly, subsequently separated from the engine crankshaft. Examination of the recovered propeller hub fracture faces disclosed fatigue cracking. The fatigue fracture propagated until it intersected the outside hub surface. According to McCauley Propeller the fatigue fracture reduced the propeller hub load carrying capacity until it was no longer a sufficient cross section to carry the centrifugal load of the propeller.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Fatigue cracking of the propeller hub that resulted in the in-flight separation of a propeller blade.

## Findings

---

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation: MANEUVERING

### Findings

1. (C) PROPELLER SYSTEM/ACCESSORIES,HUB - FRACTURED
2. (C) PROPELLER SYSTEM/ACCESSORIES,HUB - FATIGUE

-----

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

## Factual Information

On April 1, 2001, at 1400 eastern daylight time, a Globe GC1B, N78321, registered to a private owner, lost a propeller blade in-flight while maneuvering at an air show in Cherry Point, North Carolina. The formation flight was operated by the pilot under the provisions of Title 14 CFR Part 91 with no flight plan filed. Visual weather conditions prevailed at the time of the accident. The commercial pilot was not injured, and the airplane sustained substantial damage. The flight departed Cherry Point, North Carolina, at 1350.

According to the pilot, while maneuvering in the number two position of a formation of three airplanes, a propeller blade separated from the propeller hub assembly. The second propeller blade, along with the hub assembly, subsequently separated from the engine crankshaft. The second propeller blade was subsequently recovered for examination. Examination of the airplane revealed a catastrophic engine failure as a result of a propeller blade separation. Examination also revealed part of the crankshaft was sheared at the hub attachment, and numerous engine attachment bolts were sheared.

The propeller assembly examination revealed a hub fracture that originated in the root of the second inboard retention thread of the No. 2 socket. The fracture was aligned along the trail edge side of the hub. Examination of the fracture faces revealed features consistent with fatigue cracking. The fatigue fracture propagated until it intersected the outside hub surface. According to McCauley Propeller the fatigue fracture reduced the propeller hub load carrying capacity until it was no longer a sufficient cross section to carry the centrifugal load of the propeller.

The propeller examination also revealed that it had been modified for oil-fill crack detection, in accordance with McCauley Propeller, service bulletin 182, dated July 16, 1990. However, there was no evidence of the red oil found inside the hub or on any pitch change components. No oil film was present on any of the components. The retention bearing races were rusted and brinnelled consistent with the absence of lubrication while the propeller had been in operation. The condition of the components suggests that the propeller had been drained of its red oil. A review of the aircraft records showed that the airplane was modified with a Meryl Product Supplemental Type Certificate (STC), P3EA that included the installation of a McCauley model D2A34C67-NP/76C-2 propeller.

Reportedly, McCauley Propeller did not approve or seek the Federal Aviation Administration (FAA) approval of a specific airframe/engine/propeller installation of the D2A34C67 propeller on the Globe GC-1B aircraft. Note #9 of Type Certificate data sheet No. P3EA, list certain propeller engine combinations that are approved vibration wise for use on "Normal Category Single-Engine Tractor Aircraft". According to Merlyn Products and McCauley Propeller System, the accident propeller hub assembly was not approved for aerobatics flight. Reportedly, aerobatic usage of the accident type propeller hub assembly can increase the propeller operating stresses beyond the approved allowable limits. According to the pilot/owner, N78321 was not used for aerobatic flight. Meryl Products reported that the D2A34C67 propeller hub assembly is no longer available as part of STC P3EA.

## Pilot Information

<b>Certificate:</b>		<b>Age:</b>	58, Male
<b>Airplane Rating(s):</b>		<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>		<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>		<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>		<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	02/15/2001
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	05/15/2000
<b>Flight Time:</b>	6500 hours (Total, all aircraft), 2500 hours (Total, this make and model), 6000 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Globe	<b>Registration:</b>	N78321
<b>Model/Series:</b>	GC1B	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	2321
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	03/27/2001, Annual	<b>Certified Max Gross Wt.:</b>	1750 lbs
<b>Time Since Last Inspection:</b>	6 Hours	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	4968 Hours at time of accident	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO 360C
<b>Registered Owner:</b>	MICHAEL P. KENNEDY	<b>Rated Power:</b>	210 hp
<b>Operator:</b>	MICHAEL P. KENNEDY	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	NKT, 28 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	1355 EDT	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 1000 ft agl	Visibility	6 Miles
Lowest Ceiling:	Overcast / 2000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	160°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.59 inches Hg	Temperature/Dew Point:	12° C / 10° C
Precipitation and Obscuration:			
Departure Point:	CHERRY POINT, NC (NKT)	Type of Flight Plan Filed:	None
Destination:	CHERRY POINT, NC	Type of Clearance:	None
Departure Time:	1350 EDT	Type of Airspace:	Class E

## Airport Information

Airport:	Cherry Point (NKT)	Runway Surface Type:	Asphalt
Airport Elevation:	28 ft	Runway Surface Condition:	Dry
Runway Used:	32L	IFR Approach:	None
Runway Length/Width:	8000 ft / 150 ft	VFR Approach/Landing:	Forced Landing

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	35.067222, -77.415556

## Administrative Information

Investigator In Charge (IIC):	PHILLIP POWELL	Report Date:	08/26/2002
Additional Participating Persons:	Jim Allen; Greensboro FSDO; Greensboro, TN		
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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).