Aviation Investigation Final Report

Location:	Apollo Beach, Florida	**Accident Number:**	ERA13FA070
Date & Time:	November 30, 2012, 15:12 Local	**Registration:**	N2626N
Aircraft:	ROBINSON HELICOPTER R22 BETA II	**Aircraft Damage:**	Substantial
Defining Event:	Part(s) separation from AC	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The helicopter was in cruise flight about 500 feet above ground level, over a bay beach, when both of its main rotor blades separated. The helicopter subsequently descended into the bay, and the wreckage with the exception of the main rotor blades was recovered 2 days later. One main rotor blade was subsequently recovered about 1 month later, and the other main rotor blade was not recovered. With the exception of the separation of the main rotor blades, examination of the airframe and engine did not reveal any evidence of preimpact mechanical malfunctions or anomalies. Metallurgical examination of the rotor hub and the recovered main rotor blade revealed features consistent with overstress, and no preexisting cracking or fatigue was noted. Additionally, damage to the teetering stops on the rotor hub was consistent with mast bumping. The observed mast bumping could have resulted from large, abrupt flight control inputs or from a mechanical failure of the unrecovered main rotor blade.

Toxicological testing and review of the pilot's medical records revealed a history of near nightly use of zolpidem (Ambien) as a sleep aid and frequent use of rizatripan (Maxalt) to treat migraine headaches. Neither condition or its respective prescription medication for treatment was reported to the Federal Aviation Administration and if it had been, would have most likely disqualified the pilot for a medical certificate based on the frequency of use/symptoms; however, the investigation could not determine the effects, if any, that the recurrent migraine, chronic zolpidem use, and underlying sleep problems might have had on the pilot at the time of the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Mast bumping for reasons that could not be determined because one main rotor blade was not recovered.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute-cruise	Mast bumping
Enroute-cruise	Part(s) separation from AC (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On November 30, 2012, about 1512 eastern standard time, a Robinson R22 BETA II, N2626N, operated by Fly N Choppers, was substantially damaged when it impacted water, following a main rotor blade separation in flight near Apollo Beach, Florida. The airline transport pilot was fatally injured. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that departed Peter O Knight Airport (TPF), Tampa, Florida, about 1502.

According to radar data provided by the Federal Aviation Administration (FAA), the helicopter departed its home base at Clearwater Airpark (CLW), Clearwater, Florida, about 1405. It flew over the local area and landed briefly at TPF, before performing another local flight. Witnesses reported that the helicopter was flying along the beach, from north to south, about 500 feet above ground level. The witnesses heard a bang, followed by a main rotor blade separation. The helicopter then immediately rolled right and descended nose down in to a bay, about 200 yards from shore. The last radar target was recorded at 1511:51, indicating an altitude of 200 feet, about 400 yards from shore. Review of the previous five radar targets revealed that the helicopter had climbed from approximately 500 feet, to 800 feet, before descending into the water.

Pilot Information

Certificate:	Airline transport; Flight engineer; Flight instructor	**Age:**	60
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	September 26, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	31500 hours (Total, all aircraft), 290 hours (Total, this make and model)		

The pilot, age 60, held an airline transport pilot certificate with ratings for airplane single-

engine land, airplane single-engine sea, airplane multiengine land, airplane multiengine sea, and rotorcraft helicopter. His most recent FAA first-class medical certificate was issued on September 26, 2012. At that time, he reported a total flight experience of 31,500 hours. Review of the pilot's logbook revealed that he had accumulated about 290 hours of helicopter experience; of which, 10 hours were flown during the 90-day period preceding the accident. All 10 hours were flown in the accident helicopter.

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER	**Registration:**	N2626N
Model/Series:	R22 BETA II	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3644
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	November 12, 2012 100 hour	**Certified Max Gross Wt.:**	1370 lbs
Time Since Last Inspection:	55 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3413 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-360
Registered Owner:	FLY N CHOPPERS	**Rated Power:**	180 Horsepower
Operator:	FLY N CHOPPERS	**Operating Certificate(s) Held:**	None

The two-seat helicopter, serial number 3644, was manufactured in 2004. It was equipped with a Lycoming O-360, 180-horsepower engine. The helicopter's most recent 100-hour inspection was completed on November 12, 2012. At that time, the helicopter had accumulated 3412.8 hours of operation. The helicopter had flown approximately 55.2 hours from the time of the last inspection, until the accident flight.

A mechanic reported that during the most recent inspection, he had found one main rotor blade exhibiting delamination. He then replaced both main rotor blades with used blades; however, the used blades had 142.4 hours remaining on their 2,200-hour life limit and were inspected before being installed on the accident helicopter.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MCF,14 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	14:55 Local	**Direction from Accident Site:**	300°
Lowest Cloud Condition:	Few / 8000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	26°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tampa Bay, FL (TPF)	**Type of Flight Plan Filed:**	None
Destination:	Tampa Bay, FL (TPF)	**Type of Clearance:**	None
Departure Time:	15:02 Local	**Type of Airspace:**	

MacDill Air Force Base (MCF), Tampa, Florida, was located about 8 miles northwest of the accident site. The recorded weather at MCF, at 1455, was: wind 070 degrees at 8 knots; visibility 10 miles; few clouds at 8,000 feet; temperature 26 degrees C; dew point 13 degrees C; altimeter 30.17 inches Hg.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	27.780555,-82.431388

The helicopter was recovered from the bay 2 days later. The engine and rotor mast remained attached to the airframe. The rotor hub remained attached to the rotor mast and the elastic teeter stops exhibited impact damage. Both spindle assemblies and their respective rotor blades had separated from the hub; one main rotor blade (with spindle assembly) was recovered from the water about 1 month after the accident and the other main rotor blade was not located. The tailboom separated about 6 feet from the transmission and the tailrotor remained with the tailboom. Both tailrotor blades exhibited impact damage. The horizontal stabilizer separated from the tailboom and the vertical stabilizer remained attached to the horizontal. The tailboom exhibited impact damage on the upper left side. The right skid remained attached and the left skid separated. The toe from the left skid was separated and not

recovered.

The cockpit was crushed and the windscreen was not recovered. Localized impact damage was observed on the left lower side of the cockpit. Both collectives and the cyclic T-bar remained attached. The antitorque pedals on both sides of the cockpit remained attached. Continuity was established from the tailrotor through the tailrotor drive shaft, to the break in the tailboom, and in to the transmission. Continuity was also confirmed from the main rotor, through the transmission, to the tailrotor drive shaft. The cyclic remained connected via push-pull tubes to the mixer, where push-pull tubes were separated about 1 inch vertically of the mixer consistent with overstress. The push-pull tubes then continued to the swashplate. The antitorque pedals remained connected to push-pull tubes to the lower bellcrank. A push-pull tube had separated about 18 inches vertically of the lower bellcrank, consistent with overstress. Beyond the separation, the upper bellcrank was fractured and there was also a separation of a push-pull tube in the tailboom.

The carburetor heat was in the off position. The mixture control was in the full rich position. The magnetos were selected to both. The fuel selector was not recovered.

The valve covers and top spark plugs were removed from the engine and oil was noted throughout the engine. The spark plug electrodes were intact and light gray in color. The caps were also removed from the magnetos. The crankshaft was rotated by hand via the fan wheel. Camshaft, crankshaft, and valve train continuity was confirmed to the rear accessory section and thumb compression was attained on all cylinders. Both magneto gears rotated when the crankshaft rotated. The carburetor remained attached to the engine and was undamaged.

The rotor hub and the recovered main rotor blade with spindle assembly were forwarded to the NTSB Materials Laboratory, Washington, D.C., for further examination. Metallurgical examination of the components revealed features consistent with overstress and no preexisting cracking or fatigue was noted. Additionally, damage to the teetering stops was consistent with a mast bump (for more information, see Materials Laboratory Factual Reports in the NTSB Public Docket.)

Medical and Pathological Information

An Autopsy was performed on the pilot on December 2, 2012, by the State of Florida District 13 Medical Examiner's Office, Tampa, Florida. The cause of death was noted as due to blunt impact to the head and torso. Toxicological testing was performed on the pilot by the FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma. Review of the toxicological report revealed:

"Rizatriptan detected in Urine
Zolpidem detected in Liver
Zolpidem detected in Urine"

Review of the pilot's applications for FAA medical certificates revealed that he was first medically certified in 1973 and routinely medically recertified thereafter. The pilot did not report any medications, medical conditions, or physician visits until 2010, when he reported having had hernia surgery.

For many years, the pilot's aviation medical examiner was his personal physician. This physician had prescribed zolpidem (a sleep aid marketed under the trade name Ambien) for many years with the caution "do not fly an aircraft for 24 hours after taking this med." According to pharmacy records, during the last few months before the accident, the pilot had refilled this prescription monthly for 30 tablets each time. In addition, the physician had referred the pilot to a neurologist for evaluation and treatment of migraine headaches and was aware that the pilot had been prescribed rizatriptan (a vasoactive medication used to treat migraines, marketed under the trade name Maxalt) for these headaches. According to pharmacy records, the pilot routinely refilled his prescription for 9 tablets/month. According to the treating neurologist, the migraines were successfully aborted by this medication.

Additional Information

According to the FAA-H-8083-21A, Helicopter Flying Handbook, "…mast bumping is the result of excessive rotor flapping. Each rotor system design has a maximum flapping angle. If flapping exceeds the design value, the static stop will contact the mast. It is the violent contact between the static stop and the mast during flight that causes mast damage or separation."

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Dave Bear; FAA/FSDO; Tampa Bay, FL Thom Webster; Robinson Helicopter Company; Torrance, CA
Original Publish Date:	February 4, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85711