



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Nipton, California	<b>Accident Number:</b>	LAX02FA276
<b>Date &amp; Time:</b>	September 7, 2002, 04:30 Local	<b>Registration:</b>	N417MA
<b>Aircraft:</b>	Bell 222U	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	3 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Other work use		

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## Analysis

At 0401, in dark night conditions, the helicopter departed its hospital base en route to an automobile accident. At 0414 the flight crew informed the ambulance crew at the accident site that they were 16 minutes out. At 0416 the flight crew made a radio call to company dispatch informing them that operations were normal. At 0420 the flight crew contacted the ambulance crew a second time and informed them that they were 3 minutes out. At 0427 company dispatch personnel made two attempts to contact the flight crew, both of which were unsuccessful. After passing over an interstate highway, the helicopter impacted terrain in a near 45 degree nose low attitude. Two witnesses observed the helicopter flying low and slow, one estimating between 150 to 200 feet, and shining its searchlight before hitting the ground. Another witness reported seeing a very strong light sweeping across the ground from side to side and traveling at a very low height, comparing it to a police helicopter hovering low when searching, and said the helicopter appeared to be trying to land. Examination of the accident site revealed evidence of a main rotor blade separation with a debris field consisting of main rotor blade skin, honeycomb, and paint chips located 938 feet upstream of the main impact crater. Post-accident examination of the helicopter's component parts, including the main rotor blades, failed to reveal the cause for the main rotor blade separation. Examination of the aircraft's engines revealed no pre-impact anomalies.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:  
The main rotor blade separation while maneuvering for unknown reasons. A factor was the dark night condition.

### Findings

Occurrence #1: ROTOR FAILURE/MALFUNCTION  
Phase of Operation: MANEUVERING

#### Findings

1. (C) ROTOR SYSTEM,MAIN ROTOR BLADE - SEPARATION  
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: EMERGENCY DESCENT/LANDING  
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

Findings

2. TERRAIN CONDITION - GROUND
3. (F) LIGHT CONDITION - DARK NIGHT

## Factual Information

### HISTORY OF FLIGHT

On September 7, 2002, approximately 0430 Pacific daylight time, a Bell 222U twin-engine helicopter, N417MA, was destroyed after impacting terrain while maneuvering near Nipton, California. The helicopter was registered to the Wells Fargo Bank Northwest of Salt Lake City, Utah, and operated by Mercy Air Service, Inc., of Rialto, California. The instrument rated commercial pilot, flight nurse, and flight paramedic sustained fatal injuries. Dark night visual meteorological conditions prevailed for the 14 CFR Part 91 air medical transport flight for which a company visual flight rules (VFR) flight plan was filed. The flight, which departed from the operator's base near Pahrump, Nevada, at 0401, was en route to the site of an automobile accident near Baker, California.

The flight departed the Pahrump, Nevada Hospital en route to the accident site located on Interstate Highway 15 near the Bailey Road intersection. At 0414 the flight crew informed the ambulance crew at the accident site that they were 16 minutes out. At 0416 the flight crew made a radio call to Mercy Air Dispatch personnel informing them that operations were normal. At 0420 the flight crew contacted the ambulance crew and informed them that they were approximately 3 minutes out. At 0427 Mercy Air Dispatch made two attempts to contact the flight crew, both with negative results.

The wreckage of the helicopter was located approximately one-quarter mile east of Interstate 15 at Yates Well Road, about 5 miles south of State Line, Nevada. Witnesses reported observing the helicopter flying from the northwest to the southeast, crossing the interstate highway prior to impacting terrain. Five witnesses to the accident submitted statements to the NTSB investigator-in-charge (IIC). Four of the witnesses were in the process of traveling on the interstate highway when they observed the helicopter, while a fifth witness observed the helicopter after having exited the highway at the Yates Well Road exit and parking on the west side of the highway facing west.

Witness #1 reported that as she was driving south she noticed a white vapor trail in the sky, which was visible in the upper left hand corner of her windshield. She stated that it had a red glow at the head of it and appeared to be approximately 150 to 200 feet in the air when she first saw it. "The trajectory was approximately 100 degrees, going from west to east, and the trail was over the northbound lanes of the interstate when I saw it. I saw it hit the ground and explode into a 'mushroom cloud' of flame." The witness stated that after calling an emergency operator on her cell phone, she saw two additional explosions.

Witness #2 reported that as he was traveling north on I-15 coming down a mountain pass grade, he saw a helicopter flying just west of the highway with its searchlight on. The witness related, "It looked like it was looking for a place to set down. As I got further down the hill the helicopter was lower and was crossing over the highway to the east side. It just dropped like a rock and hit the ground, then exploded in a big fireball.

Witness #3 stated that while traveling southbound on I-15 he observed an aircraft's navigation

lights "coming down out of the sky at a slight angle to the surface. The aircraft hit the ground and blew up. The explosion was fairly large. I was approximately two miles from Yates Well Road when I saw the incident."

Witness #4 stated she was traveling southbound on I-15 at around 0415. She said the helicopter was southbound and was moving low and slow as it crossed over the freeway. "It shined its light on the highway before crossing over it and crashing in the desert." She further stated that it [the helicopter] appeared to be looking for something, and then it fell rapidly to the ground.

Witness #5 reported that after pulling off the interstate highway at an overpass and parking his car at a right angle to the highway facing west, he heard the sound of a helicopter approaching. The witness stated that he looked towards the sound and there was a light coming from the front of the helicopter. "The helicopter continued to head in the direction of our vehicle, traveling parallel to the highway. With the very strong light at the front sweeping across the ground from side to side, the helicopter was traveling at a very low height. I liken it to a police helicopter hovering low when searching." The witness further stated, "... for a moment the light shone directly on us as it passed over us." The witness reported that the helicopter continued to pass over them and was parallel to the highway. "When it was maybe fifty to one hundred meters past us it made a left sweeping turn, moving much more quickly than previously, and went over the lanes of the highway toward the adjacent fields. The helicopter hovered there for a moment." The witness further stated that he was sure he heard the engine stop or [make] an odd sound which was similar to that of an old car backfiring. "Then the helicopter dropped, hitting the ground with a loud popping sound. There was an explosion, and another explosion with the mushroom clouds of flames and smoke."

#### PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with ratings for rotorcraft-helicopter and instrument helicopter. His last FAA second-class medical certificate was dated April 23, 2002, with the limitation that the holder shall possess glasses that correct for near vision. Company records indicate the pilot was current and qualified in the BH-222 at the time of the accident.

#### AIRCRAFT INFORMATION

N417MA, (s/n 47527), a Bell 222U, was manufactured in 1984. Records provided by the operator indicated that main rotor blade S/N A 253 was overhauled on December 27, 2001, and main rotor blade S/N A 348 was overhauled on October 23, 2000.

The aircraft was equipped with an OuterLink satellite position reporting system. The system recorded all portions of the flight and reported latitude/longitude coordinates and ground speed at one minute intervals. The last report was recorded at 0428:19 (see ATTACHMENT #2).

#### METEOROLOGICAL INFORMATION

At 0356, the Automated Weather Observing System (AWOS) at Las Vegas, Nevada, located 42

miles north of the accident site, was reporting winds from 200 degrees at 7 knots, visibility of 10 statute miles. Scattered clouds were reported at 9,500 feet, broken clouds at 13,000 and 18,000 feet, with a temperature of 24 degrees C, dew point of 12 degrees C, and an altimeter of 29.79 inches of Mercury. Based on the elevation of the accident site being 2,660 feet, the density altitude was calculated to be 4,956 feet at the time of the accident.

## WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the wreckage distribution path of 1,153 feet was along a measured magnetic heading of 135 degrees. The main wreckage came to rest in a flat desert area of sparse bushes 3 to 4 feet high at latitude North 35 degrees 32.25 minutes and longitude West 115 degrees 25.01 minutes, at an altitude of 2,660 feet mean sea level. The beginning of the wreckage path began 938 feet prior to the main impact site, evidenced by pieces of honeycomb, pieces of fiberglass consistent with the make-up of the main rotor blade, and paint chips. The high energy impact damage and post-impact fire destroyed the aircraft.

The main impact crater, which measured 22 feet in length, 12 feet in width, and 18 inches in depth was located 29 feet from the north-south service road which bordered the impact crater on the west. A three-strand power line bordered the service road on the west, also running in a north-south direction. Interstate highway I-15 runs parallel to the service road, located approximately 1,100 feet west of the main impact area.

Prior to the main impact crater, a debris field was evident. It was oriented from the northwest to the southeast, measuring 938 feet in length and 300 feet in width. The first two-thirds of the debris field, measuring approximately 600 feet in length, was comprised of 6 pieces of main rotor blade skin, 6 pieces of honeycomb, and 7 paint chips. The remaining one-third of the debris field consisted of window glass, the upper wire cutter, a portion of storm window, and a piece of a weather window glass frame. Both engines, the engine deck, firewall, and exhaust ejectors were located in line along the wreckage distribution path approximately 51 feet from the center of and downstream of the main impact crater. The right engine transmission gear connection input quill was separated and had impact and thermal damage. The left engine-to-transmission gear connection input quill had separated and had impact damage. Both left and right oil pumps were separated and had impact damage. All four (4) hydraulic actuators had impact damage and were separated from the aircraft. One (1) actuator was destroyed as a result of thermal damage.

The main rotor blades were destroyed, having suffered impact and thermal damage. A main rotor blade scar 10 feet in length, on a northwest/southeast heading, was located adjacent to the rearward most left area of the impact crater. Lying on the north side of the impact crater were the remains of the main rotor blades, measuring approximately 30 feet in length. The rotor mast remained attached to the rotor hub. The transmission was located 20 feet from the main wreckage crater along the distribution path to the southeast.

A 10-foot section of the tail was located 21 feet from the center of the impact crater in line with the main distribution path. Both upper and lower fins were located 6 feet from the main rotor blade along the energy path. This section of the tail was intact, with the exception of the tail rotor assembly, which had separated. Approximately one foot of the lower fin was missing due

to impact and thermal damage.

All three wire cutters were separated from the main wreckage. The upper wire cutter was located 65 feet northwest of the main impact crater in the open field across the service road, and 8 feet north of the initial debris path. The wire cutter exhibited a contact signature mark on its uppermost section. The wire cutter was bent approximately 5 to 10 degrees from right to left when looking from the rear of the helicopter, and in the same direction as main rotor blade rotation. Post-accident examination of the upper wire cutter failed to reveal what the impact source was.

The main transmission was separated from the airframe during the impact sequence. The mast had separated from the transmission due to impact forces, but remained attached to the main rotor head. The main rotor blades, mast, and transmission were partially connected downstream of the main impact crater. The tail rotor gearbox was located on top of the main rotor head.

The horizontal stabilizer was separated from the tail section and located along the wreckage distribution path 45 feet from the impact crater. The right stabilizer was bent and twisted with leading edge accordion damage. The outer one-half of the left stabilizer was separated and destroyed.

The two main engine-to-transmission drive shafts exhibited severe twisting deformation.

One (1) skid tube was located 15 feet to the left of the energy path. All skid tubes and cross tubes were accounted for. The left step area of the left skid tube was located impaled in terrain at the left rearward position of the main impact crater. Only about 18 inches of this component was visible to FAA inspectors when they arrived on scene.

The center section of the helicopter was located 64 feet from the center of the main impact crater in line with the energy path.

The "Wing" was located 74 feet from the main impact crater along the distribution path.

The Environmental Control Unit was located 133 feet from the main impact crater along the distribution path of the wreckage, while the O2 oxygen bottle was located 92 feet from the main impact crater along the energy path.

Scattered debris of small pieces of the helicopter was found along the line of the distribution path toward the southeast, extending 82 feet downstream from the Environmental Control Unit.

## TESTS AND RESEARCH

The teardown and examination of both of the helicopter's engines disclosed that the type and degree of damage was indicative of engine rotation at the time of impact with the ground. No pre-existing condition was found on either engine that would have interfered with normal operation.

Examination of the helicopter's three dual actuators revealed that damage to two of the actuators was impact related. The third actuator was damaged to the point that any detailed examination of the component was impossible.

Aircraft records revealed that several repairs on the main rotor blades were accomplished. The surviving portions of the main rotor blades indicated that there were no apparent abnormalities. All but two of the areas where work order records indicated work had been accomplished were identified and no deficiencies were noted. The two not found were in portions of the blades that had been destroyed/burned.

The main rotor head and mast, pitch change horns, and lead lag dampers were unremarkable in terms of pre-impact damage. All observed damage was impact related and overload in nature. The nodal beam installation, consisting of portions of the nodal beam assembly, portions of the analog under floor flight controls, the throttle control quadrant box, lift links, and nodal beam up stops were examined. No pre-impact/post-impact fire anomalies were noted. The nodal up stops exhibited no evidence of repeated contact.

Pieces of main rotor blade skin, paint chips, and Plexiglas shards were located starting 938 feet upstream of the impact crater. Blade piece labeled as P20 was located approximately 300 feet upstream of the impact crater. P20 was painted black and determined to be a piece of the lower surface skin of the blade labeled "White" and exhibited a large radius concave indentation. Post-accident examination did not reveal what caused the indentation. A second piece of main rotor blade skin, labeled as P37, was determined to be a piece of lower surface skin of the blade labeled "Red." P37 was located approximately 938 feet upstream of the main impact crater. Post-accident examination of both blade pieces to determine if a bird strike had occurred proved negative for any organic material.

Post-accident examination revealed no evidence that power lines, which bordered the impact site 51 feet to the west, had been impacted by the helicopter.

#### MEDICAL AND PATHOLOGICAL INFORMATION

Toxicological testing on the pilot was performed by the FAA's Civil Aeromedical Institute, Oklahoma City, Oklahoma. The testing revealed 61 (mg/dL, mg/hg) ethanol detected in muscle, 3 (mg/dL, mg/hg) n-propanol detected in muscle, and 29 (mg/dL, mg/hg) Acetaldehyde detected in muscle. Carbon monoxide and cyanide testing were not performed. The toxicology screen was negative for drugs.

#### ADDITIONAL INFORMATION

The helicopter was released to United States Aviation Underwriters, Pasadena, California, on August 28, 2003.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	46, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim	<b>Last FAA Medical Exam:</b>	April 23, 2002
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	January 17, 2002
<b>Flight Time:</b>	3588 hours (Total, all aircraft), 70 hours (Total, this make and model), 60 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Bell	<b>Registration:</b>	N417MA
<b>Model/Series:</b>	222U	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	47527
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	September 5, 2002 AAIP	<b>Certified Max Gross Wt.:</b>	8250 lbs
<b>Time Since Last Inspection:</b>	0.5 Hrs	<b>Engines:</b>	2 Turbo shaft
<b>Airframe Total Time:</b>	6432.3 Hrs at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	LTS-101-750C1
<b>Registered Owner:</b>		<b>Rated Power:</b>	735 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	M89A

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night/dark
Observation Facility, Elevation:	LAS,2181 ft msl	Distance from Accident Site:	42 Nautical Miles
Observation Time:	03:56 Local	Direction from Accident Site:	5°
Lowest Cloud Condition:	Scattered / 7300 ft AGL	Visibility	10 miles
Lowest Ceiling:	Broken / 10800 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	200°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.79 inches Hg	Temperature/Dew Point:	24° C / 12° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pahrump, NV	Type of Flight Plan Filed:	VFR
Destination:	Baker, CA	Type of Clearance:	VFR
Departure Time:	04:01 Local	Type of Airspace:	Class G

## Wreckage and Impact Information

Crew Injuries:	3 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	On-ground
Total Injuries:	3 Fatal	Latitude, Longitude:	35.537498,-115.416946

## Administrative Information

Investigator In Charge (IIC):	Little, T.
Additional Participating Persons:	Richard A Monschke; Federal Aviation Administration; Fort Worth, TX Dave Dosker; Bell Helicopter Textron; Fort Worth, TX Marlin J Kruse; Honeywell; Phoenix, AZ George Dennison; Mercy Air; Boulder City, NV
Original Publish Date:	March 30, 2004
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	<a href="https://data.nts.gov/Docket?ProjectID=55650">https://data.nts.gov/Docket?ProjectID=55650</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](#).