		NTSB ID: LAX04LA216		Aircraft Registration Number: N2019F	
		Occurrence Date: 05/20/2004		Most Critical Injury: Minor	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Palmdale	State CA	Zip Code 93550	Local Time 1305	Time Zone PDT	
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Bell		Model/Series 206L-3		Type of Aircraft Helicopter	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
HISTORY OF FLIGHT					
<p>On May 20, 2004, at 1305 Pacific daylight time, a Bell 206L-3, N2019F, rolled over during a landing at Palmdale, California. Orbic Helicopter was operating the helicopter under the provisions of 14 CFR Part 91. The commercial pilot was not injured and two passengers received minor injuries. The helicopter sustained substantial damage. Visual meteorological conditions prevailed, and a flight plan had not been filed. The aerial photography flight originated at Van Nuys, California, about 0910.</p>					
<p>In the Pilot/Operator Accident Report, NTSB Form 6120.1/2, the pilot stated that he was doing an air-to-ground filming operation and had a photographic coordinator in the left seat and a cameraman with a gyro stabilized camera mount in the left door of the passenger compartment. The helicopter was traveling southbound, about 200 feet above ground level (agl), 80 knots, in a left-hand turn when he heard a bang. The pilot perceived the helicopter to yaw left, and felt vibrations. He lowered the collective, entered an autorotation and maneuvered the helicopter to an open field, flared, and approached level sandy terrain for landing. During the landing sequence the helicopter rolled over on to its right side, reversing direction 180 degrees in the process. A fire started in the engine area and the on-site support crew extinguished it immediately using handheld fire extinguishers. The pilot stated that he did not check his engine instruments during the autorotation. He verified the power loss by raising the collective slightly during the descent but he did not feel any engine power in the process.</p>					
PERSONNEL INFORMATION					
<p>A review of Federal Aviation Administration (FAA) airman records from Oklahoma City, Oklahoma, revealed the pilot held a commercial pilot certificate with airplane single/multiengine land and rotorcraft-helicopter certificates issued on February 18, 1986. He also held a flight instructor certificate in single engine airplanes and rotorcraft-helicopters, which was issued on November 15, 2002. The pilot held a second-class medical certificate that was issued on December 1, 2003, with the restriction that he possess glasses for near and intermediate vision.</p>					
<p>The pilot reported that he had 12,400 hours of total flight time, and had 4,500 hours in the Bell 206. His last biennial flight review was on May 15, 2004.</p>					
AIRCRAFT INFORMATION					
<p>The helicopter was a turbine powered, single engine, single rotor, Bell 206L-3, serial number 51032. It was powered by an Allison 250-C30P engine, serial number CAE-895066. An examination of the aircraft logbooks revealed that the last annual inspection was recorded on March 26, 2004. The airframe total time was 9,122.2 hours and the engine total time was 8,896.7 hours as of March 26,</p>					
FACTUAL REPORT - AVIATION					
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National Transportation Safety Board

FACTUAL REPORT

AVIATION

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Narrative (Continued)

2004.

The Bell Jet Ranger 206 pilot transition notebook states the following procedures for an engine failure and autorotation. "Collective pitch control - Adjust as required to maintain rotor RPM, 90% to 107%. Note: Rotor RPM maintained at the high end of the operating range will provide maximum rotor energy to accomplish the landing. Warning: Reduce forward speed to desired autorotative airspeed for existing conditions (58 to 69 MPH) (50 to 60 knots) indicated airspeed. At low altitude, close throttle and flare to lose excessive speed. Apply collective pitch as flare effect decreases to further reduce forward speed and cushion landing. It is recommended that level touch-down be made prior to passing through 70% rotor RPM."

WRECKAGE AND IMPACT INFORMATION

A FAA inspector examined the helicopter at the accident scene. The helicopter was examined in detail at Aircraft Recovery Services, Pearblossom, California, under the supervision of the National Transportation Safety Board Investigator-in-Charge (IIC). Present at the examination were representatives from the FAA, Rolls Royce, and Bell Helicopter.

Airframe

The main rotor blades were both attached to the hub and the hub was attached to the mast. Both blades were severed chordwise approximately 5-7 feet outboard of the hub. The mast had approximately a 20-degree bend located parallel to yolk static stops. One pitch change tube was severed in half.

The tail boom was separated from the airframe aft of the engine at the oil cooler location and was segmented into three groups: a 4-foot section containing the tail rotor and boom end; various intermediate boom and tail rotor drive shaft sections; and the oil cooler and tail rotor drive shaft bearing assembly. The tail rotor drive shaft sections exhibited lateral bending and crushing with no torsional signatures. The tail rotor blades had no chordwise striations or leading edge indentations. One tail rotor blade was bent outward about 30 degrees just outboard of the hub. The tail stinger had abrasions along its underside length and the lower 1/3 vertical fin was bent to the left and upward. The left horizontal stabilizer was split vertically down the center of its span. The oil cooler squirrel-cage fan blades were sheared off at the fan faceplate. The flex coupling at the oil cooler fan was torsionally buckled.

The forward short shaft that extends from the engine accessory gearbox to the oil cooler fan was severed at the oil cooler fan location with a counterclockwise twist (ref aft to forward) similar to the look of a drill bit.

The skids appeared undeformed with the cross tubes exhibiting a slight downward bow.

The flight control push-pull tubes and bell cranks were traced and continuity was established. The flight controls were moved in the cockpit and correct motion of the rotor swash plate and tail rotor control tubes were confirmed.

The helicopter's fuel boost pump was energized and 27 gallons of fuel was successfully pumped up to the airframe fuel filter and deposited in to a 50-gallon fuel drum.

Main transmission gearbox and tail rotor gearbox magnetic chip detectors were removed and examined for debris. None were found. The rotor rpm (Nr) tach-generator was rotated using an electric drill and read 40 percent Nr on the cockpit gage. The gearbox was rotated by pulling the rotor through an arc. There was no binding or grinding identified, the gearbox rotated smoothly.

Engine

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Occurrence Type: Accident

Narrative (Continued)

The engine was removed from the helicopter and examined.

Crush damage to the upper portion of the outer combustion case (OCC) was evident with a 3-inch horizontal tear-hole that protruded outwards above the fuel nozzle. The tear was part of a series of crushed folds on top of the can.

0.25 ounce of fuel was drained from the fuel nozzle hose. The fuel nozzle and screen were removed. The screen was cylindrical in shape and gray in color.

The compressor impeller was an even black and gray in color with no leading edge damage. The impeller was turned by hand and found to turn freely with no binding, the starter-generator turned in concert. The 1st stage turbine wheel was even black in color with no blade damage. The 4th stage free turbine rotated freely. The free wheel unit engaged the engine in one direction and freely turned in the other when hand rotated.

The upper and lower magnetic chip detectors were removed and examined. No debris was observed.


The engine was crated and shipped to the manufacturer for further testing.


On September 16th, under the supervision of the Safety Board IIC, the engine was uncrated at the Rolls Royce facility in Indianapolis, Indiana. The engine was visually examined and then prepared for testing. The outer combustion case (OCC) and liner were replaced with new components. The fuel nozzle and shim stack were replaced. A cracked fuel control PC-air line was replaced and the exciter box was removed. The engine was then placed in an instrumented engine test cell. The derich setting and acceleration schedule adjustment had to be adjusted to achieve a successful start. Once started, the engine successfully produced 459 ft-lb of torque. It was then set at flight idle and jam accelerated to max power. No surging or popping of the engine was noticed during the jam acceleration the turbine speeds and engine temperatures quickly stabilized. This test was performed two times with similar results. The engine operated in the test cell continuously for 1 hour 15 minutes.

ADDITIONAL INFORMATION

The wreckage was released on July 8, 2004.

This report was modified on February 20, 2008.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: LAX04LA216			
		Occurrence Date: 05/20/2004			
		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used NA	Runway Length	Runway Width
Runway Surface Type: Dirt					
Runway Surface Condition: Dry					
Type Instrument Approach: NONE					
VFR Approach/Landing: Forced Landing					
Aircraft Information					
Aircraft Manufacturer Bell		Model/Series 206L-3		Serial Number 51032	
Airworthiness Certificate(s): Normal					
Landing Gear Type: Skid					
Homebuilt Aircraft? No	Number of Seats: 7	Certified Max Gross Wt.	4150 LBS	Number of Engines: 1	
Engine Type: Turbo Shaft	Engine Manufacturer: Allison	Model/Series: 250-C30P	Rated Power: 650 HP		
- Aircraft Inspection Information					
Type of Last Inspection Annual	Date of Last Inspection 04/2004	Time Since Last Inspection 38.5 Hours	Airframe Total Time 9000 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? Yes	ELT Operated? Yes	ELT Aided in Locating Accident Site? No			
Owner/Operator Information					
Registered Aircraft Owner MK Construction		Street Address 12450 Ventura Blvd			
		City Shermon Oaks	State CA	Zip Code 91423	
Operator of Aircraft Orbic Helicopters		Street Address 16700 Roscoe Blvd			
		City Van Nuys	State CA	Zip Code 91406	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Other Work Use					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX04LA216
	Occurrence Date: 05/20/2004
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 50
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Sex: M	Seat Occupied: Right	Principal Profession: Occupational Pilot	Certificate Number: On File
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Certificate(s): Flight Instructor; Commercial

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): Airplane

Instructor Rating(s): Airplane Single-engine; Helicopter

Type Rating/Endorsement for Accident/Incident Aircraft?	Current Biennial Flight Review? 05/2004
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Medical Cert.: Class 2	Medical Cert. Status: Valid Medical--w/ waivers/lim.	Date of Last Medical Exam: 12/2003
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	12400	4500			5000			4500		
Pilot In Command(PIC)	12300	4500			5000					
Instructor	4000	1800			800					
Last 90 Days	20	20								
Last 30 Days	5	5								
Last 24 Hours	0	0								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? No
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Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Van Nuys	State CA	Airport Identifier KVNY	Departure Time 0910	Time Zone PDT
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Destination Same as Accident/Incident Location	State	Airport Identifier	
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Type of Clearance: None

Type of Airspace: Class E

Weather Information

Source of Briefing: No record of briefing

Method of Briefing: Unknown

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX04LA216
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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
KPMD	1253	PDT	Ft. MSL	NM	Deg. Mag.

Sky/Lowest Cloud Condition: Clear Ft. AGL Condition of Light: Day

Lowest Ceiling: None Ft. AGL Visibility: 10 SM Altimeter: 29.97 "Hg

Temperature: 22 °C Dew Point: 5 °C Wind Direction: 250 Density Altitude: Ft.

Wind Speed: 19 Gusts: 25 Weather Conditions at Accident Site: Visual Conditions

Visibility (RVR): Ft. Visibility (RVV) SM Intensity of Precipitation:

Restrictions to Visibility: No Obscuration; No Precipitation


Type of Precipitation:

Accident Information

Aircraft Damage: Substantial Aircraft Fire: None Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers			2		2
- TOTAL ABOARD -			2	1	3
Other Ground					
- GRAND TOTAL -			2	1	3

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX04LA216
	Occurrence Date: 05/20/2004
	Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

Van S. McKenny

Additional Persons Participating in This Accident/Incident Investigation:

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