National Transportation Safety Board
Aviation Accident Final Report

Location:	Mesa, AZ	**Accident Number:**	ANC06LA038
Date & Time:	03/22/2006, 1600 MST	**Registration:**	N912LH
Aircraft:	MD Helicopters, Inc. MD 900	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General Aviation - Other Work Use		

Analysis

The experimental category flight was being operated by the helicopter manufacturer under Title 14, CFR Part 91, when the accident occurred. The commercial certificated helicopter pilot was conducting a series of climbing and descending turns while a second helicopter, flying alongside, filmed the maneuvers. According to a safety representative for the helicopter manufacturer, all of the maneuvers were conducted within the normal limitations of the helicopter. The maneuvers were completed uneventfully, with no in-flight anomalies noted, and the helicopter returned to the manufacturer's base. While conducting a routine daily inspection of the helicopter in preparation for the next scheduled flight, maintenance technicians discovered damage to the main rotor hub's five pitch case assemblies, slightly aft of the upper damper cap. The damage was a result of the pitch cases striking the upper main rotor hub perimeter bolts. All five pitch cases were damaged beyond repairable limits, and were replaced. The safety representative for the helicopter manufacturer reported that the anticipated corrective action will be to increase the clearance between the pitch cases and the main rotor hub perimeter bolts by trimming additional material from the inboard and upper portion of the main rotor pitch case assemblies during the manufacturing process.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The manufacturer's inadequate design clearance of the main rotor blade grip pitch cases, which resulted in damage to the pitch cases when they contacted main rotor perimeter bolts during maneuvering flight.

Findings

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

Findings
1. (C) ROTOR SYSTEM,MAIN ROTOR HUB GRIP(SLEEVE) - SCORED
2. (C) ACFT/EQUIP,INADEQUATE CONTROL SHAPE/SIZE - MANUFACTURER
3. ROTOR SYSTEM,MAIN ROTOR HUB GRIP(SLEEVE) - CLEARANCE

Factual Information

On March 22, 2006, about 1600 mountain standard time, an MD Helicopters MD 900 helicopter, N912LH, owned and operated by MD Helicopters, Inc., Mesa, Arizona, sustained substantial damage while maneuvering near Mesa. The commercial certificated pilot and one crewman were not injured. The experimental category flight was being operated as an air-to-air photographic flight under Title 14, CFR Part 91, when the accident occurred. Visual meteorological conditions prevailed at the time of the accident, and company flight following procedures were in effect. The local area flight originated at the Falcon Field Airport, Mesa, about 1530.

A postflight inspection of the helicopter disclosed damage to all five of the main rotor hub pitch cases.

During a telephone conversation with the National Transportation Safety Board investigator-in-charge on March 28, an aviation safety representative for MD Helicopters reported that the purpose of the flight was to photograph the accident helicopter during flight. During the flight, the pilot of the accident helicopter was required to maneuver the helicopter through a series climbing and descending turns while a second helicopter, flying alongside, filmed the maneuvers. The safety representative reported that all of the maneuvers were conducted within the normal limitations of the helicopter. All of the maneuvers were completed uneventfully, with no in-flight anomalies noted, and the helicopter returned to the MD Helicopters facility in Mesa.

According to the safety representative, on March 23, while conducting a routine daily inspection of the helicopter in preparation for flight, maintenance technicians discovered damage to the main rotor hub's five pitch case assemblies. He said that the damage to each main rotor hub pitch case was limited to the upper inboard lip, slightly aft of the upper damper cap. He described the impact damage as a result of the pitch cases striking the upper main rotor hub perimeter bolts. All five pitch cases were damaged beyond repairable limits, and were subsequently replaced.

In the NTSB Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1) submitted on behalf of MD Helicopters, the safety representative reported that following this event, the anticipated corrective action will be to increase the clearance between the pitch cases and the main rotor hub perimeter bolts by trimming additional material from the inboard and upper portion of the main rotor pitch case assemblies during the manufacturing process.

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	45, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without Waivers/Limitations	**Last FAA Medical Exam:**	08/01/2005
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	11266 hours (Total, all aircraft), 1017 hours (Total, this make and model), 10801 hours (Pilot In Command, all aircraft), 146 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	MD Helicopters, Inc.	**Registration:**	N912LH
Model/Series:	MD 900	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Experimental	**Serial Number:**	900-00095
Landing Gear Type:	Skid	**Seats:**	8
Date/Type of Last Inspection:	01/01/2006, 100 Hour	**Certified Max Gross Wt.:**	6500 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo Shaft
Airframe Total Time:	77.04 Hours at time of accident	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	Installed, not activated	**Engine Model/Series:**	PW207E
Registered Owner:	MD Helicopters, Inc.	**Rated Power:**	18400 hp
Operator:	MD Helicopters, Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	20 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	Variable	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	MESA, AZ (FFZ)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Mesa, AZ (FFZ)	**Type of Clearance:**	None
Departure Time:	1530 MST	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	33.460833, -111.728333

Administrative Information

Investigator In Charge (IIC):	Clinton O Johnson	**Report Date:**	10/31/2006
Additional Participating Persons:	Judy Baty; Phoenix FSDO		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		