National Transportation Safety Board
Aviation Accident Final Report

Location:	BETHANY, OK	**Accident Number:**	FTW96TA222
Date & Time:	05/16/1996, 1500 CDT	**Registration:**	N520DD
Aircraft:	McDonnell Douglas MD-520N	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General Aviation - Public Aircraft		

Analysis

Prior to the landing, the instructor pilot verified the wind from the tower (180 degrees at 19 knots, gusting to 22 knots). With the helicopter stable on the ground, downwind from a nearby building, the flight controls were frictioned down and normal shut down procedures were started. Passing through 19% rotor RPM, the rotor brake was applied. To demonstrate that the rotor would continue turning without rotor brake application, the instructor released the brake at 10% RPM and allowed the rotors to turn down to 9% RPM. The rotor brake was then re-applied, and while the rotor was decelerating, 'two or three thumps were heard', and the instructor observed the rotors 'jerk and come to a stop.' The instructor stated that wind being redirected around the building may have caused the rotors to flap down into the tail boom. Examination of the aircraft revealed that at least two of the three main rotors contacted the tail boom. No mechanical defects were found in the flight control and rotor systems. According to the manufacturer's flight manual, the shut down sequence and rotor brake application were conducted in accordance with current published procedures.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The main rotor blades' contact with the tail boom due to gusting winds during rotor deceleration.

Findings

Occurrence #1: MISCELLANEOUS/OTHER
Phase of Operation: STANDING - IDLING ROTORS

Findings
1. (C) ROTOR SYSTEM,MAIN ROTOR BLADE - BLADE STRIKE
2. (C) WEATHER CONDITION - GUSTS
3. WEATHER CONDITION - TAILWIND

Factual Information

On May 16, 1996, approximately 1500 central daylight time, a McDonnell Douglas MD-520(NOTAR) helicopter, N520DD, owned by U.T.E. Management Corporation, and operated by the Federal Aviation Administration (FAA) as a Title 14 CFR Part 91 public use training flight, sustained substantial damage while executing shut down procedures at Wiley Post Airport, Bethany, Oklahoma. Visual meteorological conditions prevailed and no flight plan was filed. The airline transport rated pilot-in-command and the pilot receiving the training were not injured. Both occupants were FAA Aviation Safety Inspectors. The flight was conducted locally and had just landed for final shut down and parking.

At 1400 the helicopter departed to conduct an evaluation/currency flight for an FAA Aviation Safety Inspector and to familiarize him with the NOTAR helicopter. The pilot-in-command (instructor) was an FAA Aviation Safety Inspector qualified in the helicopter. Subsequent to one hour of uneventful flight, the aircraft landed at the east ramp of the airport. During the approach to landing, the Wiley Post tower reported (to the pilots) winds from 180 degrees at 19 knots, gusting to 22 knots. After the landing, the instructor lifted the helicopter into a hover and demonstrated an autorotation from a hover with no difficulty. Upon completion of the maneuver, the instructor hover taxied to near the original parking spot from which the flight commenced. The nose was oriented to 360 degrees and the helicopter was landed in front of a hangar building (tail facing toward the building). The instructor stated that he selected the landing spot in front of the building because he thought it would block much of the wind. Prior to shut down the instructor demonstrated how to center the rotor disc utilizing outside reference points.

With the helicopter stable on the ground, the flight controls were frictioned down and normal shut down procedures were started. Passing through 19% rotor RPM, the rotor brake was applied. To demonstrate that the rotor would continue turning without rotor brake application, the instructor released the brake at 10% RPM and allowed the rotors to turn down to 9% RPM. The rotor brake was then re-applied, and while the rotor was decelerating, "two or three thumps were heard", and the instructor observed the rotors "jerk and come to a stop." The instructor stated that wind being redirected around the building may have caused the rotors to flap down into the tail boom. According to the manufacturer's flight manual, the shut down sequence and rotor brake application were conducted in accordance with current published procedures.

Examination of the aircraft by a FAA inspector revealed that at least two of the three main rotors had struck the tail boom, resulting in structural damage to the rotors. No mechanical anomalies or pre-existing defects were found in the flight control system or rotor system (including the rotor brake system).

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	55, Male
Airplane Rating(s):	Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider; Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Helicopter; Instrument Airplane; Instrument Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	09/01/1995
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	10000 hours (Total, all aircraft), 7 hours (Total, this make and model), 9500 hours (Pilot In Command, all aircraft), 33 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	McDonnell Douglas	**Registration:**	N520DD
Model/Series:	MD-520N MD-520N	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	LN0030
Landing Gear Type:	Skid	**Seats:**	5
Date/Type of Last Inspection:	09/01/1995, Annual	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo Shaft
Airframe Total Time:	185 Hours	**Engine Manufacturer:**	Allison
ELT:		**Engine Model/Series:**	250-C20R/2
Registered Owner:	FAA	**Rated Power:**	450 hp
Operator:	FAA	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	, 0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	0000	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear / 0 ft agl	**Visibility**	15 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	19 knots / 22 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	(PWA)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:	1400 CDT	**Type of Airspace:**	Class D

Airport Information

Airport:	WILEY POST (PWA)	**Runway Surface Type:**	
Airport Elevation:	1299 ft	**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

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:**	

Administrative Information

Investigator In Charge (IIC):	ALEXANDER LEMISHKO	**Report Date:**	05/23/1997
Additional Participating Persons:	WAYNE COOK; OKLAHOMA CITY, OK		
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/.		