Aviation Investigation Final Report

Location:	MESA, Arizona	**Accident Number:**	LAX98LA093
Date & Time:	February 3, 1998, 09:35 Local	**Registration:**	N9204D
Aircraft:	Boeing MD600N	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

While in the process of verifying a height/velocity performance data point, the pilot entered an autorotation at takeoff power and maximum gross weight. The onboard telemetry revealed that the pilot reduced the throttle to flight idle at the entry point but that the remaining momentum caused the aircraft to accelerate and climb. During the descent, the main rotor rpm decayed and an excessive vertical sink rate developed. The aircraft landed hard at the intended touchdown point. The aircraft was hover-taxied from the landing area and a normal shutdown was completed. The test pilot reported that the height/velocity data point was outside the aircraft's performance capabilities.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the attempt by flight test engineers to verify a height/velocity data point that was subsequently shown to be outside the aircraft's performance capabilities.

Findings

Occurrence #1: HARD LANDING
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Findings
1. AUTOROTATION - INTENTIONAL - PILOT IN COMMAND
2. (C) AIRCRAFT PERFORMANCE,LANDING CAPABILITY - EXCEEDED

3. (C) HEIGHT/VELOCITY CURVE - EXCEEDED - PRODUCTION/DESIGN PERSONNEL
4. (C) AUTOROTATION - NOT POSSIBLE

Factual Information

On February 3, 1998, at 0935 hours mountain standard time, a Boeing MD600N, N9204D, experienced a hard landing while performing an autorotative landing at Falcon Field, Mesa, Arizona. The aircraft sustained substantial damage; however, the pilot, the sole occupant, was not injured. The aircraft was being operated as a test flight by Boeing Mesa when the accident occurred. The flight originated in Mesa at 0736 on the morning of the accident. Visual meteorological conditions prevailed at the time and no flight plan was filed.

At the time of the accident, the pilot was in the process of verifying a theoretical height/velocity performance data point. He had entered an autorotation at 14 feet agl and 30 knots airspeed while at takeoff power, and a gross weight of 4,100 pounds. The planned entry point was 10 feet agl and 20 knots airspeed. The onboard telemetry verified that the pilot had reduced the throttle to flight idle at the entry point. After the throttle reduction, however, the remaining momentum allowed the aircraft to accelerate to 30 knots and climb an additional 23 feet agl. During the subsequent descent, the main rotor rpm decayed and an excessive vertical sink rate developed. The aircraft landed hard at the intended touchdown point, while in a near level attitude. The aircraft was hover-taxied from the landing area and a normal shutdown was completed.

A postaccident inspection of the aircraft revealed the airframe and landing gear exhibited bending, cracking, and tearing from fuselage station (FS) 78.5 to FS44.65. The bulkhead at FS124 and the engine door frame at FS137.5 were buckled and cracked on both the left and right sides. The cockpit seat pan support structures were buckled. The right and left landing gear struts were also bent and displaced.

The test pilot reported that the height/velocity data point attempted was shown to be outside the aircraft's performance capabilities.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	50,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider; Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 14, 1997
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	10361 hours (Total, all aircraft), 308 hours (Total, this make and model), 6526 hours (Pilot In Command, all aircraft), 54 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N9204D
Model/Series:	MD600N MD600N	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	RN004
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	May 5, 1997 100 hour	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:	164 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	191 Hrs	**Engine Manufacturer:**	Allison
ELT:	Not installed	**Engine Model/Series:**	250-C47M
Registered Owner:	BOEING AIRCRAFT	**Rated Power:**	650 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:	BOEING MESA	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 20000 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	1 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(FFZ)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	VFR
Departure Time:	07:36 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	FALCON FIELD FFZ	**Runway Surface Type:**	Asphalt
Airport Elevation:	1392 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	4L	**IFR Approach:**	None
Runway Length/Width:	3800 ft / 75 ft	**VFR Approach/Landing:**	Simulated forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	33.509574,-111.579498(est)

Administrative Information

Investigator In Charge (IIC):	Crispin, Robert
Additional Participating Persons:	JOHN A ELLER; SCOTTSDALE , AZ
Original Publish Date:	February 15, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=30037