Aviation Investigation Final Report

Location:	Council Bluffs, Iowa	**Accident Number:**	CHI02LA293
Date & Time:	September 24, 2002, 15:00 Local	**Registration:**	N1040S
Aircraft:	Hughes 269A	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The helicopter landed hard despite cyclic being applied during an instructional flight in which a certified flight instructor (CFI) and a dual student, seeking a CFI certificate, were performing autorotations. Inspection of the wreckage revealed a fractured cyclic/mixture support attachment bracket. A major portion of the fracture surface contained a very dark discoloration. The discoloration was heavier on the forward side of the fracture, and there were portions of the fracture without discoloration on the aft side of the fracture. Prolonged ultrasonic cleaning in an acetone failed to remove significant amount of this discoloration. The discoloration covered more than 85 percent of the fracture surface. Examination of the fracture surface with a scanning electron microscope after cleaning revealed that the discolored areas had a rounded globular appearance, typical of casting porosity. Features typical of overstress separation were noted in areas without discoloration. The broken arm also contained a secondary crack that extended aft from near the forward edge.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The premature fracture of the cyclic/mixture bracket resulting in the inability to conduct a landing flare.

Findings

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

Findings
1. AUTOROTATION - SIMULATED
2. FLARE - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #2: HARD LANDING
Phase of Operation: LANDING

Findings
3. (C) ROTORCRAFT FLIGHT CONTROL,CYCLIC CONTROL - FRACTURED

Factual Information

On September 24, 2002, at 1500 central daylight time, a Hughes 269A, N1040S, operated by Iowa Western Community College as a flight training aircraft, was substantially damaged during a hard landing at Council Bluffs Municipal Airport (CBF), Council Bluffs, Iowa. The certified flight instructor and dual student were practicing autorotations. Visual meteorological conditions prevailed at the time of the accident. The 14 CFR Part 91 instructional flight was not operating on a flight plan. The local flight originated from CBF about 1345.

The dual student was receiving instruction in preparation for a certificated flight instructor certificate with a helicopter rating.

The instructor stated that the day prior to the accident , he and the student had flown 3.2 hours performing various training maneuvers including touchdown autorotations, hovering autorotations, hovering, straight-in, and autorotations with a turn. On the day of the accident, the winds were from 170 degrees at 12 knots with peak gusts of 20 knots. An autorotation was started at 2,200 feet msl, 60 knots and abeam the pad. The instructor described the student's entry as excellent. The collective was reduced with corresponding needle split, the pedals were adjusted to keep the helicopter in trim, the cyclic was adjusted to a 50 knot attitude, and 180-degree turn was initiated. The rotor rpm was within limits through out the turn. About 1,800 feet msl, the turn was completed, the helicopter was aligned with the taxiway, in trim, airspeed slightly less than 55 knots, and the rotor rpm was in the green. At 1,500 msl, the instructor placed his left hand on the throttle and confirmed override. About 50 feet agl and just prior to deceleration, the instructor confirmed that the rotor rpm was in the green. The student started his deceleration by applying aft cyclic. About 8-12 feet agl, the student made his initial application and felt slight forward cyclic to level the helicopter was felt by the instructor. The initial pitch application was at the proper height and the proper descent. They both applied full collective with no results, and the helicopter fell thru and impacted the ground.

Inspection of the wreckage revealed a fractured cyclic/mixture support attachment bracket which was sent to the National Transportation Safety Board's Materials Laboratory. Visual examination disclosed that a major portion of the fracture surface contained a very dark discoloration. The discoloration was heavier on the forward side of the fracture, and there were portions of the fracture without discoloration on the aft side of the fracture. Prolonged ultrasonic cleaning in an acetone failed to remove significant amount of this discoloration. The discoloration covered more than 85 percent of the fracture surface. Examination of the fracture surface with a scanning electron microscope after cleaning revealed that the discolored areas had a rounded globular appearance, typical of casting porosity. Features typical of overstress separation were noted in areas without discoloration. The broken arm

also contained a secondary crack that extended aft from near the forward edge.

Pilot Information

Certificate:	Commercial; Private	**Age:**	48,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	January 15, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	December 30, 2001
Flight Time:	2043 hours (Total, all aircraft), 75 hours (Total, this make and model), 1924 hours (Pilot In Command, all aircraft), 66 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	46,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	July 24, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	June 18, 2002
Flight Time:	5747 hours (Total, all aircraft), 814 hours (Total, this make and model), 5454 hours (Pilot In Command, all aircraft), 39 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Hughes	**Registration:**	N1040S
Model/Series:	269A	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:		**Serial Number:**	56-0534
Landing Gear Type:	Ski	**Seats:**	2
Date/Type of Last Inspection:	August 27, 2002 Annual	**Certified Max Gross Wt.:**	1600 lbs
Time Since Last Inspection:	54.5 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	10383.7 Hrs	**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	HIO-360-B1A
Registered Owner:	Iowa Western Community College	**Rated Power:**	180 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CBF,1253 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	15:05 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / 21 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	22°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Council Bluffs, IA (CBF)	**Type of Flight Plan Filed:**	None
Destination:	(CBF)	**Type of Clearance:**	None
Departure Time:	13:45 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Council Bluffs Municipal CBF	**Runway Surface Type:**	Concrete
Airport Elevation:	1253 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Simulated forced landing

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	41.259445,-95.760002

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Tom L Clifton; Des Moines FSDO; Ankenny, IA
Original Publish Date:	September 30, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=55800