



# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Chandler, AZ	<b>Accident Number:</b>	LAX02LA121
<b>Date &amp; Time:</b>	04/01/2002, 0955 MST	<b>Registration:</b>	N21901
<b>Aircraft:</b>	Rotorway Exec 165F	<b>Injuries:</b>	1 Serious, 1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

## Analysis

The helicopter collided with the ground following a loss of tail rotor drive during a steep approach. After performing various maneuvers, the certified flight instructor (CFI) and the student began traffic patterns to a landing zone (LZ). On short final, approximately 40 feet agl, and 40 mph, the helicopter yawed left slowly. When the helicopter had reached a 45-degree left yaw, the CFI took the controls. As the helicopter approached a 90-degree left yaw, the CFI had applied full right pedal. Simultaneously, he lowered the collective and reduced power. The helicopter rotated 360 degrees about 3 times before impact. Post accident inspection revealed incorrect installation of the forward end of the intermediate drive belt on the intermediate pulley group. The tail rotor drive system uses three belts, interconnected via pulleys at various points within the tail boom, to drive the tail rotor. The forward and aft belts and pulleys were normal. The intermediate belt was found shredded, burned, and separated. The aft end of the intermediate belt was positioned correctly on the rear pulley; however, the forward end was around the wrong pulley, the one meant for the forward belt, which induced a large misalignment of the intermediate belt and consequent rub between it and the pulley side. All pulleys were installed with specified tightness and with fore/aft play as stated in the maintenance manual. Maintenance records for the helicopter indicated that the belts were replaced twice in the past 8 months, both times by the manufacturer. The first time was in August 2001, for a heavy maintenance rebuild. The second time was in November 2001 following a tail rotor strike. The belts had about 200 hours operating time since their last replacement in November.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The tail rotor drive system failure as a result of incorrect installation procedures by the manufacturer's personnel.

## Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

### Findings

1. (C) ROTOR DRIVE SYSTEM, TAIL ROTOR DRIVE SHAFT - FAILURE
2. (C) MAINTENANCE, INSTALLATION - IMPROPER - MANUFACTURER

Occurrence #2: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

### Findings

- 3. (C) TAIL ROTOR/ANTI-TORQUE CONTROL - NOT AVAILABLE
- 4. DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
 Phase of Operation: DESCENT - UNCONTROLLED

Findings

- 5. TERRAIN CONDITION - GROUND

### Flight Instructor Information

<b>Certificate:</b>	Flight Instructor; Commercial	<b>Age:</b>	47
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Instrument Rating(s):</b>	Helicopter
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Instructor Rating(s):</b>	Helicopter
<b>Flight Time:</b>	1600 hours (Total, all aircraft), 800 hours (Total, this make and model), 1500 hours (Pilot In Command, all aircraft)		

### Student Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Instructor; Commercial; Flight Engineer	<b>Age:</b>	55
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land; Single-engine Sea	<b>Instrument Rating(s):</b>	Airplane
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Instructor Rating(s):</b>	None
<b>Flight Time:</b>	17000 hours (Total, all aircraft), 1 hours (Total, this make and model), 13000 hours (Pilot In Command, all aircraft), 180 hours (Last 90 days, all aircraft), 60 hours (Last 30 days, all aircraft)		

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Rotorway	<b>Registration:</b>	N21901
<b>Model/Series:</b>	Exec 165F	<b>Engines:</b>	1 Reciprocating
<b>Operator:</b>	Cobb International, Inc.	<b>Engine Manufacturer:</b>	Rotorway
<b>Operating Certificate(s) Held:</b>	None	<b>Engine Model/Series:</b>	162F
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

### Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KCHD, 1243 ft msl	<b>Weather Information Source:</b>	Weather Observation Facility
<b>Lowest Ceiling:</b>	None	<b>Wind Speed/Gusts, Direction:</b>	/ ,
<b>Temperature:</b>	23° C	<b>Visibility</b>	35 Miles
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Chandler, AZ (P19)	<b>Destination:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious, 1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Latitude, Longitude:</b>	33.269167, -111.811111		

## Administrative Information

<b>Investigator In Charge (IIC):</b>	JEFF RICH	<b>Adopted Date:</b>	02/05/2004
<b>Investigation Docket:</b>	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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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