Aviation Investigation Final Report

Location:	Smoketown, Pennsylvania	**Accident Number:**	ERA12LA373
Date & Time:	May 30, 2012, 20:10 Local	**Registration:**	N8707E
Aircraft:	FALTIN JOHN R ROTORWAY EXEC 162F	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to the pilot/owner/builder of the experimental amateur-built helicopter, he had recently finished performing maintenance on the helicopter, which included tracking its rotor system. He then positioned the helicopter in front of his hangar and proceeded to perform an operational check, before attempting to hover the helicopter. Immediately upon entering the hover, the pilot felt a large amount of vibration in the cyclic control and the helicopter began moving to the left. The pilot pushed the cyclic control right in an effort to stop the left movement of the helicopter, but the control input was ineffective. The pilot then increased the helicopter's altitude to avoid a collision with nearby obstacles and attempted to maneuver to an open grass area. Realizing that the rotor rpm had decayed, he reduced the collective pitch and increased engine power. The helicopter then entered a settling-with-power flight condition and impacted a taxiway located between two hangars.

During a telephone interview conducted about 2 weeks after the accident, the pilot stated that the loss of control that precipitated the accident was most likely due to improper tracking of the helicopter's main rotor blades, related to the method of leveling the blades he had used during the helicopter's most recent maintenance.

A postaccident examination of the wreckage revealed that the cyclic control cross tube had separated from its attachment point at the left side of the fuselage, adjacent to a break in a repair weld of the fuselage's tubular frame. Detailed examination of the fracture surface revealed that while the weld was of a generally poor quality, the fracture exhibited features consistent with a failure in bending overload. Given the nature of the failure, it is most likely that the weld fractured during the impact sequence.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A loss of control during a post-maintenance test flight due to improper tracking of the helicopter's main rotor blades by the pilot/aircraft builder.

Findings

Aircraft	Main rotor blade system - Incorrect service/maintenance
Personnel issues	(general) - Owner/builder

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Maneuvering-hover	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On May 30, 2012, about 2010 eastern daylight time, am experimental amateur-built Rotorway Exec 162F, N8707E, was substantially damaged during a hard landing at Smoketown Airport (S37), Smoketown, Pennsylvania. The commercial pilot/owner/builder of the helicopter incurred minor injuries. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to the pilot, he had recently finished performing maintenance on the helicopter, which included tracking its rotor system following removal of the main rotor blades. He then positioned the helicopter in front of his hangar and proceeded to perform an operational check before attempting to hover the helicopter. Immediately upon entering the hover, the pilot felt a large amount of vibration in the cyclic control and the helicopter began moving to the left. The pilot pushed the cyclic control right in an effort to stop the left movement of the helicopter, but the control input was ineffective. The pilot then climbed the helicopter to avoid a collision with several nearby posts and the hangar, and attempted to maneuver to an open grass area. Realizing that the rotor rpm had decayed, he reduced the collective pitch and increased engine power. The helicopter then entered "settling with power" and impacted a taxiway located between two hangars.

Federal Aviation Administration inspectors examined the helicopter following the accident. During the examination the inspectors found that the helicopter's tubular steel frame had fractured in two locations. Each location was the site of a weld repair, which according to the pilot, were performed following a previous hard landing in 2006. The inspectors also found that the cyclic control cross tube had disconnected from its pivot point on the left side of the fuselage frame, just aft of one of the previously observed separations in the frame. The inspectors reported no other evidence of any pre-impact mechanical malfunctions or failures.

The portions of the tubular frame encompassing the fractures were sectioned from the wreckage and forwarded to the NTSB Materials Laboratory for detailed examination. The first two halves of tubular frame pieces examined were located adjacent to the left front skid attachment point. The tube pieces exhibited a branched circumferential fracture that followed several external porous weld deposits, arc strikes, areas of burn-through, and two cross-drilled holes. The tube weldment exhibited fracture features consistent with a failure in bending overstress.

The second set of structural tubing was recovered from the engine mount area, and was fractured through the filet weld deposit where a square tube was joined to a round tube. The thermal discoloration of the paint and the morphology of the weld deposit in the vicinity of the fracture were consistent with

weld deposit overlay over an existing filet weld. The weld deposit in the region of the fracture exhibited undercut, incomplete fusion, overlap, insufficient throat, burn-through, and poor filet formation. The fracture of the weld exhibited features consistent with failure due to bending overstress.

During a telephone interview conducted by a Federal Aviation Administration (FAA) inspector several weeks after the accident, the pilot stated that he believed that the loss of control that had precipitated the accident was due to improper main rotor blade tracking, and specifically, related to the method of leveling the blades he had utilized during the helicopter's most recent maintenance.

Pilot Information

Certificate:	Private	**Age:**	62
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 13, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 11, 2010
Flight Time:	159 hours (Total, all aircraft), 100 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	FALTIN JOHN R	**Registration:**	N8707E
Model/Series:	ROTORWAY EXEC 162F	**Aircraft Category:**	Helicopter
Year of Manufacture:	2006	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	F6203
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	December 6, 2011 Condition	**Certified Max Gross Wt.:**	1450 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	200 Hrs	**Engine Manufacturer:**	Rotorway International
ELT:	Installed, not activated	**Engine Model/Series:**	RI 162F
Registered Owner:	On file	**Rated Power:**	150 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LNS,403 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	330°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.72 inches Hg	**Temperature/Dew Point:**	24°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Smoketown, PA (S37)	**Type of Flight Plan Filed:**	None
Destination:	Smoketown, PA (S37)	**Type of Clearance:**	None
Departure Time:	20:10 Local	**Type of Airspace:**	

Airport Information

Airport:	Smoketown Airport S37	**Runway Surface Type:**	
Airport Elevation:	370 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	40.04,-76.201667(est)

Administrative Information

Investigator In Charge (IIC):	Diaz, Dennis
Additional Participating Persons:	Ronald A Forsyth; FAA/FSDO; Harrisburg, PA
Original Publish Date:	March 24, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=83806