Aviation Investigation Final Report

Location:	Mesquite, Nevada	**Accident Number:**	WPR13LA191
Date & Time:	April 14, 2013, 10:20 Local	**Registration:**	N87114
Aircraft:	Ercoupe 415-C	**Aircraft Damage:**	Substantial
Defining Event:	Part(s) separation from AC	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The propeller departed the airplane during the initial climb following takeoff, and the pilot performed a forced landing into a rocky field. The airplane sustained substantial damage to the right wing and firewall during the accident sequence; the pilot was not injured.

The propeller and its associated hub mounting hardware were not recovered. The threaded portion of the crankshaft had been flattened by the propeller's hub, indicating that the hub nut was in place but had backed off during the flight. The nut had backed off most likely because the incorrect torque had been applied during its reinstallation, about 40 flight hours before the accident flight.

Probable Cause and Findings

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

Separation of the propeller from the engine during initial climb due to the incorrect torque applied to the propeller hub nut during maintenance.

Findings

Aircraft	Propeller assembly - Incorrect service/maintenance
Personnel issues	Installation - Maintenance personnel

Factual Information

History of Flight

Initial climb	Part(s) separation from AC (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

On April 14, 2013, about 1020 Pacific daylight time, an Engineering and Research Corporation (Ercoupe) 415-C, N87114, landed hard during a forced landing shortly after takeoff from Mesquite Airport, Mesquite, Nevada. The pilot was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. The private pilot sustained minor injuries; the airplane sustained substantial damage to the right wing and firewall during the accident sequence. The cross-country personal flight departed Mesquite about 1015, with a planned destination of Ely Airport, Ely, Nevada. Visual meteorological conditions prevailed, and a visual flight rules flight plan had been filed.

The pilot reported that the ground run-up, takeoff, and initial climb were uneventful, with the airplane maintaining a climb rate of 500 feet per minute, at an engine speed of 2,300 rpm. About 5 minutes later, he felt a low frequency vibration, and assuming it was an engine speed related harmonic, reached forward to adjust the throttle. Just as he reached forward, the engine speed surged to 4,000 rpm, and he immediately retarded the throttle. The pilot could not see any propeller movement, and the engine did not appear to be producing thrust. In an attempt to diagnose the problem, he advanced the throttle again, and the engine surged to 4,200 rpm. The pilot realized that the propeller had separated from the engine, and began to configure the airplane for a forced landing.

He stated that due to the altered center of gravity with the propeller missing, he was unable to maintain positive airplane control at any airspeed below 85 mph. He subsequently performed a forced landing into rocky desert scrub, about 5 miles from the airport.

The airplane had undergone an annual inspection on August 6, 2012, at a tachometer time of 264.2 hours. Maintenance records indicated that at the time of inspection, the Continental C85-12 engine, serial number 27027-7-12, had accrued 320.2 hours since overhaul in July 1996. An entry dated July 27, 2012, indicated that the propeller was removed to facilitate the installation of the crankshaft oil seal at a tachometer time of 252.3 hours. The tachometer on the airplane at the accident site indicated 294.5 hours.

The crankshaft was of the tapered type, with the propeller hub and flange assembly being held in place with a single hub nut. The tapered portion of the crankshaft was keyed to accept the propeller hub assembly. The crankshaft tip, propeller hub, and hub nut all contained four "safety holes" drilled 90 degrees apart radially. The design was such that a flat-head pin was installed through one of these holes once they were aligned, after the correct hub nut torque was applied. A cotter pin was utilized to retain the flat-head pin. According to representatives from Continental Motors, once the correct hub nut torque was applied, the flat-head and cotter pins should be loose within the assembly, a tight fit indicating that the propeller hub nut had backed off.

Neither the propeller nor its associated hub hardware forward of the crankshaft seal was recovered. The crankshaft was removed from the engine to facilitate inspection. Its threaded portion exhibited flattening and peening damage to about 45 percent of its surface. Three of the four safety holes were round and appeared undamaged, with the fourth exhibiting elongation in the plane of rotation, and material smear of its outer lip.

The owner stated that the crankshaft oil seal was replaced due to an oil leak. He did not recall seeing a cotter pin ever installed on the hub nut, noting instead the use of a cadmium plated bolt and "Nyloc" nut.

Pilot Information

Certificate:	Private	**Age:**	66
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
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:**	August 9, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 27, 2012
Flight Time:	1674 hours (Total, all aircraft), 100 hours (Total, this make and model), 1589 hours (Pilot In Command, all aircraft), 7 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Ercoupe	**Registration:**	N87114
Model/Series:	415-C	**Aircraft Category:**	Airplane
Year of Manufacture:	1946	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	287
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	August 6, 2012 Annual	**Certified Max Gross Wt.:**	1260 lbs
Time Since Last Inspection:	42.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1800 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C91A installed, activated, aided in locating accident	**Engine Model/Series:**	C85
Registered Owner:	On file	**Rated Power:**	75 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:	KLAS,2181 ft msl	**Distance from Accident Site:**	69 Nautical Miles
Observation Time:	08:56 Local	**Direction from Accident Site:**	229°
Lowest Cloud Condition:	Scattered / 25000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.65 inches Hg	**Temperature/Dew Point:**	22°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Mesquite, NV (67L)	**Type of Flight Plan Filed:**	VFR
Destination:	Ely, NV (KELY)	**Type of Clearance:**	None
Departure Time:	10:15 Local	**Type of Airspace:**	

Airport Information

Airport:	Mesquite 67L	**Runway Surface Type:**	Asphalt
Airport Elevation:	1978 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	01	**IFR Approach:**	None
Runway Length/Width:	5121 ft / 75 ft	**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:**	36.89611,-114.049446(est)

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Mark X Hutton; Federal Aviation Administration FSDO; Las Vegas, NV
Original Publish Date:	June 2, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=86645