Aviation Investigation Final Report

Location:	Glendale, Arizona	**Accident Number:**	WPR21LA037
Date & Time:	November 4, 2020, 12:20 Local	**Registration:**	N87GX
Aircraft:	REMOS AIRCRAFT GMBH FLUGZEUGBAU GX	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

Upon landing, the airplane veered to the left and the flight instructor took control of the airplane, preventing a runway excursion. During the landing, roll a grinding noise occurred and the flight instructor was able to shut down the airplane on a nearby taxiway.

A postaccident examination revealed that the aluminum carry-through spar failed in overstress. A portion of the failed carry-through remained attached to the landing gear and breached the composite structure, entering the cabin floor under the passenger seat. About 12 inches of the carry-through structure had separated from the airplane, permitting the horizontal stabilizer and elevator to skid on runway surface, eroding the composite structure. The fracture surfaces exhibited features consistent with overstress and hardness; conductivity measurements were consistent with a material that met the minimum strength requirements for the carry-through.

A review of the maintenance records revealed that the manufacturer's service bulletin for the mandatory inspection had been accomplished. The service bulletin called for the replacement of the carry-through as soon as practical, but, at the latest, after detection of cracks or 800 total landings, which ever came first. The carry-through failure occurred when the airplane had accumulated nearly 437 landings. The accident airplane was operated as a flight training airplane and likely experienced a hard landing during flight training operations, which may have accelerated the carry-through overstress failure.

Probable Cause and Findings

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

The material overstress failure of the airframe's aluminum carry-through of the main landing gear.

Findings

Aircraft	Gear attach fittings (on fus) - Failure
Aircraft	Fuselage attach fittings sys - Failure

Factual Information

History of Flight

Landing-landing roll	Landing gear collapse (Defining event)

On November 04, 2020, at 1220 mountain standard time, a Remos Aircraft GMBH Fleugzebau, GX, N87GX, was substantially damaged when it was involved in an accident near Glendale, Arizona. The certificated flight instructor and the student pilot were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The flight instructor reported that the purpose of the flight was for the student pilot to practice takeoffs and landings. The flight instructor reported that during a landing, the airplane veered left of the runway centerline, and, in response, he took the controls to prevent a runway excursion. The flight instructor noted that maneuvering the airplane back to the runway centerline was difficult. The airplane subsequently made a grinding noise, and they could feel an unusual vibration. The flight instructor was able to maneuver the airplane to the nearest taxiway, where he shut down the airplane.

A postaccident examination revealed that the aluminum carry-through of the main landing gear failed during landing. A portion of the failed aluminum carry through remained attached to the landing gear and breached the composite structure, entering the cabin floor under the passenger seat. About 12-inches of the carry through structure had separated from the airplane, permitting the horizontal stabilizer and elevator to skid on runway surface, eroding the composite structure.

The failed carry through was sent to the National Transportation Safety Board's Material Laboratory, and the Senior Material Engineer reported that the carry-through appeared to have failed in overstress. The fracture surfaces all exhibited features consistent with overstress and hardness plus conductivity measurements were consistent with a material that met the minimum strength requirements.

A review of the airframe maintenance logbook indicated that all aircraft safety alerts and airworthiness directives for the airframe had been complied with. On December 17, 2009, the manufacturer issued Service Bulletin SB-002-landing-gear for the accident airplane. The service bulletin required the inspection of the aluminum carry through for the main landing gear immediately if there had been a hard landing in the past, within the next 50 landings, and during scheduled maintenance (100-hr, and Annual Condition Inspection), and after any hard landing. During an interview with the recently hired Light Sport Repairman Maintainer, he reported that he completed the required inspection for cracks, specifically near the weight reduction holes on October 29, 2020.

During the October 2020 100-hr inspection, the maintainer recalled that there were no visible cracks or signatures of deformation to the carry-through. According to the service bulletin, replacement of the carry-through was required as soon as practical but at the latest after detection of cracks, or after 800 total landings, which ever came first. At the time of the maintainer's inspection, the airplane had accumulated 402 estimated landings and amassed 317.9 total airframe hours. At the time of the accident, the airplane had accumulated 437 estimated landings.

Flight instructor Information

Certificate:	Commercial; Flight instructor; Remote	**Age:**	43,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Helicopter	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	February 26, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 4, 2019
Flight Time:	(Estimated) 3374 hours (Total, all aircraft), 20.1 hours (Total, this make and model), 3238.6 hours (Pilot In Command, all aircraft), 25.7 hours (Last 90 days, all aircraft), 21.3 hours (Last 30 days, all aircraft), 0.7 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	67,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	None With waivers/limitations	**Last FAA Medical Exam:**	November 30, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 128.9 hours (Total, all aircraft), 68.2 hours (Total, this make and model), 27 hours (Pilot In Command, all aircraft), 32.8 hours (Last 90 days, all aircraft), 12.9 hours (Last 30 days, all aircraft), 0.7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	REMOS AIRCRAFT GMBH FLUGZEUGBAU	**Registration:**	N87GX
Model/Series:	GX	**Aircraft Category:**	Airplane
Year of Manufacture:	2009	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	351
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	October 29, 2020 Condition	**Certified Max Gross Wt.:**	1320 lbs
Time Since Last Inspection:	16.9 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	334.8 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	C126 installed, not activated	**Engine Model/Series:**	912ULS/309120110
Registered Owner:	Culprit Aviation LLC	**Rated Power:**	100 Horsepower
Operator:	Fly Eagle Sport	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KGEU,1066 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	11:50 Local	**Direction from Accident Site:**	53°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	28°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Glendale, AZ	**Type of Flight Plan Filed:**	None
Destination:	Glendale, AZ	**Type of Clearance:**	VFR
Departure Time:		**Type of Airspace:**	Class D

Airport Information

Airport:	Glendale Municipal Airport GEU	**Runway Surface Type:**	Asphalt
Airport Elevation:	1071 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	01	**IFR Approach:**	None
Runway Length/Width:	7150 ft / 100 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	33.526917,-112.29513(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Michael
Additional Participating Persons:	Thomas Dickerson; FAA; Scottsdale, AZ
Original Publish Date:	August 16, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102241