Aviation Investigation Final Report

Location:	Heber, Utah	**Accident Number:**	WPR18LA272
Date & Time:	September 25, 2018, 11:00 Local	**Registration:**	N90339
Aircraft:	Smith Aerostar601	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot stated he touched down normally and during the landing roll, the airplane veered left coming to rest off the runway surface. The airplane sustained substantial damage to the right wing and horizontal stabilizer.

Postaccident examination of the landing gear assembly revealed that the weld had failed on the joint attached to the main landing gear cylinder and upper scissor assembly. Most of the fracture surface of the failure surface had been obliterated by smearing and grinding, consistent with post-fracture damage. The degree of the fracture surface damage was consistent with the fracture and separation happening before the accident. Landing gear components are under cyclic loads at every landing and during landing actions (such as braking or taxiing). There was no evidence of fatigue, corrosion, or other progressive mechanisms would have led to the fracture of this joint from the strut cylinder.

It is likely that a recent hard landing fractured the joint from the cylinder, but it could not be determined whether this occurred during the accident landing or beforehand due to the damage incurred after the gear collapsed.

Probable Cause and Findings

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

A recent hard landing resulted in a fracture of a joint from a cylinder to a main landing gear.

Findings

Aircraft	Main gear strut/axle/truck - Failure

Factual Information

History of Flight

Landing-landing roll	Landing gear collapse (Defining event)

On September 25, 2018 about 1100 mountain daylight time, a Smith Aerostar 601P, N90339, was substantially damaged when it was involved in an accident near Heber, Utah. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The personal cross-country flight departed from Brigham City Regional Airport (BMC), Brigham City, Utah, about 1030 with a planned destination of Heber.

The pilot stated he touched down normally on runway 22 at Heber City Municipal Airport (HCR), Heber, Utah. During the landing roll, the airplane veered left and continued off the runway surface. Despite his attempts, the pilot was unable to regain control, and the right main landing gear collapsed. Upon egressing the airplane, the pilot observed that the left main landing gear had failed at the strut's weld, and the airplane sustained substantial damage to…

Postaccident examination of a portion of the left main landing gear assembly by the National Transportation Safety Board Materials Laboratory revealed that the weld had failed on the joint attached to the landing gear cylinder and upper scissor assembly. The inboard fitting of the joint remained affixed to the scissor assembly by an attachment bolt. The joint was loose where it attached to the cylinder, and it could be rotated against the cylinder exterior. The adjacent hexagonal cap below the loose joint was still tight against the cylinder assembly (see figure).

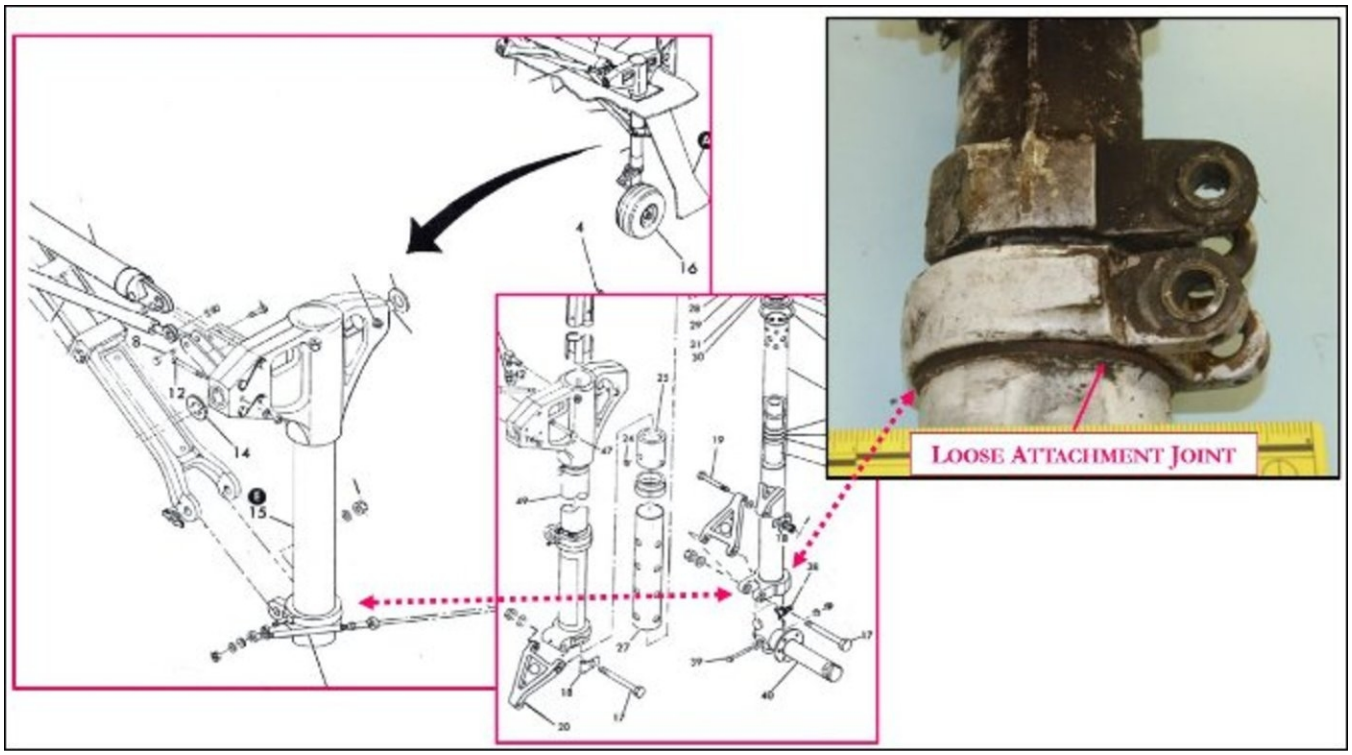

Figure: Diagram and forward aft view picture of the left main landing gear

The attachment joint had fractured and separated about the entire circumference of the cylinder exterior. This separation allowed the joint (and linkage) to rotate approximately 30° about the cylinder. The fracture surface of the attachment joint faced upward on the strut cylinder where the joint had been welded to the cylinder. Examination of the joint portions of the fracture surface, particularly along the fractured weld protrusions, did not reveal any fracture features. Portions of the external weld on the joint exhibited features of localized deformation, all of which were consistent with overstress fracture. Most of the fracture surface features had been obliterated by smearing and grinding, consistent with post fracture damage. The degree of the fracture surface damage was consistent with the fracture and separation existing prior to the accident. Landing gear components are under cyclic loads at every landing and during landing actions (such as braking or taxiing).

According to a representative of Aerostar, the airframe manufacturer, the attachment joint failure looked like the same type of failure that a few Aerostar airplanes had in the early 1970s because of an inadequate braze joint, which allowed the landing gear to rotate. Following those failures, the manufacturer enhanced the brazing methods and performed an x-ray inspection after furnace brazing to verify that the surface braze was complete. The manufacturer was not aware of any recent failures occurring in this area and there is not a specific inspection for this braze and further stated that, with multiple hard landings or an opposing gear collapsing, the gear could fail at the braze joint from overstress. A failure of the weld makes the airplane uncontrollable on the ground.

Pilot Information

Certificate:	Commercial	**Age:**	66,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Balloon; Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 22, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 6, 2017
Flight Time:	8887 hours (Total, all aircraft), 1828 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Smith	**Registration:**	N90339
Model/Series:	Aerostar601 P	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	61P-0196-015
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	April 9, 2018 Annual	**Certified Max Gross Wt.:**	6000 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3069.1 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-AA1A5
Registered Owner:	On file	**Rated Power:**	340 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:	K36U,5637 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	16:56 Local	**Direction from Accident Site:**	251°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.26 inches Hg	**Temperature/Dew Point:**	13°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Brigham City, UT (BMC)	**Type of Flight Plan Filed:**	None
Destination:	Heber, UT (HCR)	**Type of Clearance:**	VFR
Departure Time:	10:30 Local	**Type of Airspace:**	

Airport Information

Airport:	Heber City Municipal Airport HCR	**Runway Surface Type:**	Asphalt
Airport Elevation:	5636 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	22	**IFR Approach:**	None
Runway Length/Width:	6898 ft / 75 ft	**VFR Approach/Landing:**	Full stop;Valley/terrain following

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	40.482776,-111.426109

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	Rhaundale Hinson ; Federal Aviation Administration; Salt Lake City, UT
Original Publish Date:	February 9, 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=98353