NATIONAL TRANSPORTATION SAFETY BOARD
AVIATION HIGHWAY MARINE RAILROAD PIPELINE

Aviation Investigation Final Report

Location:	Santa Barbara, California	**Accident Number:**	WPR19LA242
Date & Time:	August 25, 2019, 22:24 Local	**Registration:**	N119TG
Aircraft:	Lockheed C130	**Aircraft Damage:**	Substantial
Defining Event:	Part(s) separation from AC	**Injuries:**	7 None
Flight Conducted Under:	Part 91: General aviation - Ferry		

Analysis

During the final leg of a cross-country flight, the flight crew heard a loud popping noise and a loud bang. Simultaneously, the torque gauges provided unusual and fluctuating readings. A crew member in the cargo compartment announced misting hydraulic fluid mixed with smoke. The crew donned their supplemental oxygen and the cockpit crew turned off the bleed air from the four engines. The crew subsequently diverted to a nearby airport and trouble shot multiple anomalies, including engine fire warning lights from the Nos. 3 and 4 engines and the loss of normal hydraulic pressure. The captain elected to feather the No. 4 engine but did not shut down the No. 3 engine at that time to retain three-engine performance. During landing, the captain was unable to maintain directional control and the airplane departed the runway. The captain then intentionally ground looped the airplane to avoid hitting the main terminal building and airplanes that were parked on the ramp. The airplane undercarriage, right wing, and nose area were substantially damaged.

Postaccident examination of the airplane revealed that the No. 3 bleed air duct had failed. Further examination of the bleed air duct revealed stress corrosion cracking preceded by corrosion pitting on the interior surfaces. The microscopic features observed were consistent with pre-existing cracking prior to the final circumferential fracture of the duct. When the duct failed due to corrosion, hot air was directed onto surrounding electrical wires and hydraulic lines, which subsequently resulted in numerous system failures. The captain was subsequently unable to maintain directional control during the landing roll.

Probable Cause and Findings

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

The failure of the No. 3 bleed air duct due to corrosion, which resulted in numerous system failures and the pilot’s inability to maintain directional control during the landing roll.

Findings

Aircraft	(general) - Fatigue/wear/corrosion
Aircraft	Directional control - Attain/maintain not possible

Factual Information

History of Flight

Initial climb	Part(s) separation from AC (Defining event)

On August 25, 2019, at 2224 Pacific daylight time, a Lockheed C-130A airplane, N119TG, was substantially damaged when it was involved in an accident at Santa Barbara Municipal Airport (SBA), Santa Barbara, California. The two pilots and five crewmembers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 positioning flight.

The operator reported that the airplane was stationed in Malaysia and was relocating to the operator's home base at Phoenix-Mesa Gateway Airport (IWA), Phoenix, Arizona, for a maintenance C-check. The flight had made a refueling stop in Hilo, Hawaii, and another refueling stop at Santa Maria Public Airport (SMX), Santa Maria, California.

Soon after departing from SMX, the flight crew contacted air traffic control and cancelled their instrument flight rules (IFR) clearance when they broke out of the clouds. Shortly after cancelling IFR, the crew heard a loud popping noise and a loud bang. Simultaneously, the torque gauges provided unusual and fluctuating readings. A crew member in the cargo compartment announced misting hydraulic fluid mixed with smoke. The crew donned their supplemental oxygen and the cockpit crew turned off the bleed air from the four engines. At this time, they also noticed the utility hydraulic pressure fluctuating and a crew member advised that the landing gear should be lowered before there was a total utility system failure. The landing gear was lowered, and the crew observed three green lights from the landing gear. The flight crew then turned off the Nos. 2 and 4 hydraulic pumps. As they continued to troubleshoot the multiple failures, they diverted to SBA based on weather considerations.

While enroute to SBA the airplane began yawing back and forth and the Nos. 3 and 4 fire handles illuminated. The captain elected to feather the No. 4 engine, which stopped the yaw of the airplane. He elected not to shut down the No. 3 engine at that time to retain three-engine performance.

Upon reaching SBA and landing, the captain applied full inboard reverse thrust as soon as the nose landing gear touched down. The right wing began to drop, and the airplane drifted to the right, so the captain applied full left rudder and began using the No. 1 engine reverse to keep the airplane on the runway. The airplane continued to the right and departed the right side of the runway. The captain then intentionally ground looped the airplane, as it was continuing toward SBA's main terminal and parked airplanes. The airplane came to a stop about 270° right of the runway heading. The airplane undercarriage, right wing, and nose area were substantially damaged.

Federal Aviation Administration (FAA) inspectors inspected the airplane and identified that the No. 3 bleed air duct had failed.

According to the operator, the inner wing bleed air duct (part number 19-353632-14) had failed in a location close to the fuselage on the right side of the airplane, which allowed hot air to blow onto the surrounding electrical wires and hydraulic lines.

The failed bleed air duct and a flange remnant were sent to the National Transportation Safety Board (NTSB) metallurgical laboratory in Washington, D.C. The chemical composition of the flange and duct was consistent with 321 austenitic stainless steel. Examination of the bleed air duct revealed stress corrosion cracking preceded by corrosion pitting on the interior surfaces. This cracking proceeded circumferentially along the upper boundary of the weld between the flange piece and the duct end. The microscopic features observed were consistent with pre-existing cracking prior to the final circumferential fracture of the duct. This cracking was located adjacent to the welded joint between the flange and the duct. The cracking was manifest as mixed intergranular fracture with cleavage fracture, consistent with lowered ductility. The lowered ductility was due to the chemical attack inherent in stress corrosion cracking (SCC). The remainder of the duct remnant fracture was consistent with having plastically deformed and fractured from tensile overstress.

Pilot Information

Certificate:	Airline transport; Flight engineer; Flight instructor	**Age:**	66,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Glider; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 10, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 23, 2019
Flight Time:	(Estimated) 25453 hours (Total, all aircraft), 1205 hours (Total, this make and model), 20857 hours (Pilot In Command, all aircraft), 160 hours (Last 90 days, all aircraft), 82 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Airline transport; Flight engineer; Flight instructor; Military	**Age:**	65,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 5, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 31, 2019
Flight Time:	(Estimated) 10400 hours (Total, all aircraft), 94 hours (Total, this make and model), 4800 hours (Pilot In Command, all aircraft), 97 hours (Last 90 days, all aircraft), 85 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

Flight engineer Information

Certificate:	Flight engineer; Military	**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Center
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 7000 hours (Total, all aircraft)		

Other flight crew Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft)		

Other flight crew Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft)		

Other flight crew Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft)		

Other flight crew Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Lockheed	**Registration:**	N119TG
Model/Series:	C130 A	**Aircraft Category:**	Airplane
Year of Manufacture:	1957	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	57-520
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	August 7, 2019 AAIP	**Certified Max Gross Wt.:**	124200 lbs
Time Since Last Inspection:	15113 Hrs	**Engines:**	4 Turbo prop
Airframe Total Time:	15112.9 Hrs as of last inspection	**Engine Manufacturer:**	Allison
ELT:	C126 installed, not activated	**Engine Model/Series:**	T-56-A-9
Registered Owner:	International Air Response	**Rated Power:**	3750 Horsepower
Operator:	International Air Response	**Operating Certificate(s) Held:**	Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	KSBA,8 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	21:53 Local	**Direction from Accident Site:**	279°
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	18°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Santa Maria, CA (SMX)	**Type of Flight Plan Filed:**	VFR/IFR
Destination:	Phoenix, AZ (IWA)	**Type of Clearance:**	IFR;VFR on top;VFR flight following
Departure Time:	22:04 Local	**Type of Airspace:**	Class D;Class E

Airport Information

Airport:	Santa Barbara Muni SBA	**Runway Surface Type:**	Asphalt
Airport Elevation:	13 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	07	**IFR Approach:**	None
Runway Length/Width:	6052 ft / 150 ft	**VFR Approach/Landing:**	Forced landing;Straight-in

Wreckage and Impact Information

Crew Injuries:	7 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	7 None	**Latitude, Longitude:**	34.423332,-119.83666(est)

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	James S Belknap; Federal Aviation Administration; Van Nuys, CA Bill Grantham; International Air Response; Mesa, AZ
Original Publish Date:	September 23, 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=100144

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.