
 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: LAX99FA311		Aircraft Registration Number: N57LR	
		Occurrence Date: 09/18/1999		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place RENO		State NV	Zip Code 89506	Local Time 1605	Time Zone PDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility: 1			
Aircraft Information Summary					
Aircraft Manufacturer No American/Rogers B L		Model/Series P-51R /P-51R		Type of Aircraft Airplane	
Revenue Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>HISTORY OF FLIGHT</p> <p>On September 18, 1999, at 1605 hours Pacific daylight time, an experimental North American/Rogers P-51R, N57LR, was destroyed by impact with the ground following in-flight separation of the empennage control surfaces of the highly modified aircraft. The accident occurred during the annual Reno National Championship Air Races at Reno/Stead Airport, Reno, Nevada, on the first lap of heat 3A in the unlimited gold category. The airline transport pilot was fatally injured. The flight was operated by the pilot under the provisions of 14 CFR Part 91. Visual meteorological conditions prevailed and no flight plan was filed.</p> <p>Videotaped recordings of the accident show the empennage horizontal and vertical stabilizers and control surfaces of the aircraft separating abruptly as the aircraft made a left turn at the number 1 pylon east of the airport. The nose of the aircraft then pitched down and the left wing separated near the root.</p> <p>The team crew chief reported that before the race, the pilot said his race strategy would be to remain higher than the other aircraft in the field and to descend later in the race after passing most of the field. Video footage was reviewed, which was taken from the area of the runway 8 threshold looking east toward the number 1 pylon. In approximately the 10 seconds before the empennage components separated from the aircraft, it was flying well above and outside the other aircraft in the field. As other aircraft in the field entered the turn at pylon 1, their bank angle was approximately 60 degrees to the left, whereas the accident aircraft was only banking about 40 degrees. Following review of the tape footage, the consensus of ground crew members was that the flight profile of the aircraft as it approached pylon number 1 was unusual. The pilot was flying wider and higher than normal, and the aircraft's bank angle was not as steep as they would have expected based upon their pre-race briefing. The ground crew believed that the pilot did not seem to be competitively racing at that point.</p> <p>The pilot of another race aircraft was about 50 yards behind the accident aircraft and was preparing to pass on the outside at the time of the empennage separation. From his experience in this and prior races against the accident aircraft, this pilot opined that the accident aircraft had modest pitch and directional stability. He said it was not uncommon to see the aircraft climb and descend 50 or 60 feet due to limited pitch stability particularly early in a race while the pilot was still involved with cockpit activities and communications. Later, when settled into the race, the pitch oscillations were less noticeable. This pilot also commented that on this particular day, because wind was calm, they were flying through a lot of wake-induced turbulence, which would have increased the workload for the pilot. Regarding the aircraft's position high and outside some of the other racers, this pilot didn't believe that this was that abnormal. The Saturday race was a heat race and pilots are conserving their aircraft and engines for the final race on Sunday. This pilot said that he was flying his aircraft at 370 KIAS and was overtaking the</p>					
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accident aircraft at a substantial rate.

AIRCRAFT INFORMATION

The aircraft, first flown in spring, 1997, utilized a North American P-51D fuselage, a Piper Aerostar landing gear assembly mated to a Learjet 23 wing (less tip tanks), and a Learjet 23 horizontal stabilizer and elevator. The vertical stabilizer and rudder were from a P-51H. The engine was a Rolls-Royce Griffin with contra-rotating 3-blade propellers. The Learjet main landing gear wheel wells in the wing were closed and the wing was modified to install the landing gear near the wing leading edge to maintain the P-51 conventional landing gear arrangement.

The co-owner of the aircraft said that before leaving the aircraft's home base of Seattle for Reno, the crew had changed the engine oil and spark plugs. There was no major maintenance performed and no flight control or landing gear maintenance. The aircraft departed Seattle for Reno on September 10; however, the pilot landed at Eugene, Oregon, because of a propeller oil seal leak. After repair, another pilot ferried the aircraft from Eugene to Reno on September 12. On September 13, 14, and 15, the pilot flew the aircraft for race qualification, one flight of about 20 minutes on each day. After the flight on the 15th, in response to high engine coolant temperatures, the coolant radiator was removed, recored and reinstalled. On September 16, a heat race about 25 minutes duration was flown. After that race, the crew replaced the voltage regulator and alternator. On September 17, the aircraft was flown one lap around the course for a flight duration of about 20 minutes. The accident flight was the only flight of the day on September 18.

COMMUNICATIONS

After takeoff, the pilot reported to his crew chief that the aircraft was operating normally. The last communication between the aircraft and the crew chief occurred approximately 30 seconds before the accident when the aircraft was between pylons 5 and 6, and consisted of a routine pilot report that electrical system voltage was normal.

WRECKAGE AND IMPACT INFORMATION

The accident location is approximately 1 mile east of the Stead Airport. The aircraft wreckage was spread over approximately a 0.5-mile path on a northeasterly heading. The southwestern 1/2 of the wreckage field was in unpopulated, hilly desert terrain covered with dry grasses and desert shrubs typically 2 feet high. The elevation is approximately 5,050 feet. The northeastern 1/2 of the wreckage path was in the Lemmon Valley residential housing tract of homes on approximately 2-acre lots.

At the southwestern end of the wreckage field, the first aircraft component located was the lower half-span of the rudder, which was the only component found on the south side of Albert (Bravo) Road. The rudder section was picked up and brought to the investigators by a searcher who then left the (Reno) area, and the exact location where the rudder was located could not be determined.

Approximately 1/8 mile northeast of the area where the rudder was located, approximately at latitude 39 degrees 40.00 minutes north and 119 degrees 51.49 minutes west (all latitude/longitude coordinates are GPS), was a debris field about 500 feet long. Major components in the southwestern end of this debris field included the horizontal stabilizer and elevator, the vertical fin less rudder, the rudder trim tab, the left flap, part of the left spoiler, and a section of the left main landing gear door. At the northeast end of the field were small parts associated with the structure of the left wing, including a section of spar cap about 2 feet long from near the landing gear wheel well which exhibited wing (tip) downward bending.

The upper half-span of the rudder with the rudder mass balance attached was located about 1,900 feet east-northeast of the above debris field.

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Approximately 1,200 feet further northeast was an area of disturbed dirt about 20 feet wide, 30 feet long, and up to 18 inches deep. Over a fan-shaped area 500 feet northeast of the disturbed dirt, was a debris field of fuselage and cockpit wreckage. Plexiglas resembling that used in the canopy was found in the area of disturbed dirt, and about 300 feet northeast, the propeller assembly, broken from the engine with the reduction gearing assembly, was found against the back of a residence at 275 Ramsey. The horizontal stabilizer trim actuator was found in this debris field and the screw jack-type electro-mechanical actuator was in the near-full nose down trim position. The tail wheel hydraulic actuator was found in the extended position. According to a party representative familiar with the aircraft, the horizontal stabilizer trim actuator position was normal for racing and the tail wheel hydraulic actuator position corresponded to the landing gear extended position. The landing gear control was between the up and down position detents, and the detent stops were visibly undamaged.

Approximately 1,000 feet east from the location of the horizontal stabilizer was the left wing in the yard of the residence at 12240 Darlene. At the wing root separation the lower wing skin exhibited a folded appearance and the upper skin exhibited a torn appearance.

The right wing with wing center section attached was located approximately 500 feet east-northeast of the area of disturbed dirt near a shed behind a residence at 260 Ramsey. The right main landing gear, operated by a hydraulic actuator (cylinder) with an integral down lock, was found in the down and locked position. The landing gear up-lock was closed and undamaged.

The aircraft's engine was located approximately 900 feet northeast of the area of disturbed dirt behind the residence at 12185 Salmon. The supercharger assembly was in the street (Salmon) in front of the house.

The wreckage located the furthest distance northeast was a section of the engine mount found against a garage about 1,275 feet northeast of the area of disturbed dirt.

The aircraft was further examined on October 5, 1999, at the facilities of SafeStore, Inc., in Mather, California.

The rudder exhibited a shredded appearance through the midspan in proximity of the rudder trim tab.

The trim tab remained attached to the tab hinge and the hinge remained attached to the u-channel section, which formed the trailing edge of the rudder. The rivets that attach the u-channel to the rudder skins were sheared. The upper and middle rudder hinges remained attached to the vertical fin aft spar. The formed sheet aluminum brackets, which attach the hinge into the rudder spar structure tore out of the rudder and remained with the hinges and vertical fin spar. The lower hinge, which attaches to the rudder spar by means of a threaded rod end, was torn out of the rudder spar and the threaded portion of the rod end had shiny metal residue in the root area of the threads. The threaded portion of the rod end was bent approximately 10 degrees downward. The rudder control horn and travel stop bell crank assembly was separated from the fuselage attachment point. One travel stop arm was broken off near the base and the other arm was bent.

One propeller blade was separated from the hub but was recovered from the area of the fuselage wreckage. All six blades of the propeller were bent aft in a smooth, uniform manner and the tips were present on all six blades. There were no appreciable gouges in the leading edges.

The ailerons were present and the travel stops were undamaged. There was no perceptible looseness in the aileron trim tab linkages.

MEDICAL AND PATHOLOGICAL INFORMATION

The co-owner of the aircraft reported that, while ferrying the aircraft from Seattle to Reno, 1

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week before the accident (September 11, 1999), the pilot landed at Eugene, Oregon, due to a propeller oil seal leak. The following morning the pilot experienced abdominal discomfort and went to a local hospital emergency room. According to hospital records from the visit, the pilot was examined over a 5-hour period, at the end of which, he reported feeling "considerably better." The records also state that the pilot had a history of colon carcinoma with chemotherapy about 5 to 6 years prior. In his summary, the attending physician stated that he had advised the pilot that having had previous bowel surgery he was at risk for a bowel obstruction and had recommended that the pilot be admitted to the hospital for additional testing. The pilot elected to be discharged. Another pilot was retained to pickup the airplane at Eugene and fly it on to Reno.

The aircraft co-owner said that in the 5- or 6-day period between when the pilot landed in Eugene and the date of the accident, the pilot appeared normal and showed no evidence of being in discomfort at any time. To the best of the co-owner's knowledge, the pilot did not seek any further medical attention during the week. The pilot flew the airplane 3 or 4 times during the week; sometimes for maintenance checks and sometimes for qualifying. The co-owner did note that the pilot "hardly ate at all" during the week but that he went out and had a big dinner the night before the day of the accident. The co-owner added, however, that it was always the pilot's practice to eat lightly and consume no alcohol during race week.

An autopsy was performed on the pilot by the Washoe County (Nevada) Coroner's Office, file number 083099. A toxicological analysis was performed by the Federal Aviation Administration Civil Aeromedical Institute in Oklahoma City, Oklahoma.

TESTS AND RESEARCH

The engineering test pilot who originally tested the aircraft said that, in the course of the testing, he flew it to 480 KIAS and applied 6 g's positive at that speed. He performed sideslips at speeds up to 350 KIAS, though not necessarily full rudder deflections. Flutter testing was performed out to 480 KIAS using a mallet to rap the control stick to excite roll and pitch and rudder steps to excite yaw. No ground vibration tests (GVT) were performed. Based upon level flight speed capability, he estimated that at the time of the accident the aircraft was flying 370 +/- 10 KIAS.

Videotaped recordings, obtained from spectators and from the official race video vendor, were reviewed. In one spectator video, taken from a grandstand location, the aircraft is viewed from the rear during the breakup and accident sequence. Viewing this video, it was the consensus of the investigation group that, in the seconds prior to the empennage separation, while the wing, fuselage, and horizontal stabilizer remained visible on the video; the vertical stabilizer and rudder disappeared. The video technician said that the disappearance of the vertical fin and rudder might have been the result of "video smearing." The technician said that if the rudder was moving rapidly and the video image recorder rate could not keep up with it, the image "smears" or "disappears" from the video image. It was the consensus of the investigation group that in the second or two before the empennage separated, the aircraft yawed to the left (right sideslip) and then the horizontal and vertical fins rolled off the fuselage to the left side as an assembly. It was also the consensus of the group that, as the aircraft yawed to the left, the left aileron was deflected downward and the right aileron upward. The various empennage pieces appeared to separate after the assembly was off the fuselage. The aircraft then pitched nose down and the left wing separated downward.

A video technician also noted that there was a small white (bright) spot on the cloud background that the accident aircraft flew in front of immediately prior to the start of the breakup sequence.

Backing up the video, it appeared that another P-51 race plane flew through the same location about 5 seconds prior.

The co-owner of the aircraft reported that the landing gear extension speed was 170 knots, the

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extension time was 7 seconds, and that the left main landing gear extension preceded the right gear.

ADDITIONAL INFORMATION

Other additional parties to the investigation were: Mr. Dale V. Stolzer, Shady Shores, TX 76208; Mr. Robert Manelski, Issaquah, WA 98029 and Mr. John H. Puckett, Everett, WA 98204.

The aircraft wreckage was released to Mr. Robert Norris, adjuster for Universal Loss Management on December 6, 1999.

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Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
RENO/STEAD	4SD	Ft. MSL	0		
Runway Surface Type:					
Runway Surface Condition:					
Approach/Arrival Flown: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
No American/Rogers B L		P-51R /P-51R		87-1002	
Airworthiness Certificate(s): Experimental (Special)					
Landing Gear Type: Retractable - Tailwheel					
Amateur Built Acft? Yes	Number of Seats: 1	Certified Max Gross Wt.		9800 LBS	Number of Engines: 1
Engine Type:	Engine Manufacturer:	Model/Series:		Rated Power:	
Reciprocating	Rolls-Royce	GRIFFON MK-58		2500 HP	
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection		Airframe Total Time	
Annual	07/1999	24 Hours		113 Hours	
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
GARY R. LEVITZ/BILL ROGERS		439 SANDY TRAIL			
		City	State	Zip Code	
		RICHARDSON	TX	75030	
Operator of Aircraft		Street Address			
GARY R. LEVITZ/BILL ROGERS		439 SANDY TRAIL			
		City	State	Zip Code	
		RICHARDSON	TX	75030	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Unknown					

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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 61
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Sex: M	Seat Occupied: Front	Occupational Pilot? Business	Certificate Number: On File
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Certificate(s): Airline Transport; Commercial

Airplane Rating(s): Multi-engine Land; Single-engine Land; Single-engine Sea

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Current Biennial Flight Review?

Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 08/1999
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	6500	2000	4500	2000						
Pilot In Command(PIC)										
Instructor										
Instruction Received										
Last 90 Days	30									
Last 30 Days										
Last 24 Hours										

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? Yes	Second Pilot? No
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Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Same as Accident/Incident Location	State	Airport Identifier 4SD	Departure Time 1550	Time Zone PDT
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Destination Local Flight	State	Airport Identifier	
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Type of Clearance: VFR

Type of Airspace: Class D

Weather Information

Source of Wx Information:

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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
RNO	1556	PDT	5046 Ft. MSL	1 NM	250 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			6000 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: Broken		10000 Ft. AGL		Visibility: 10 SM	Altimeter: 29.00 "Hg
Temperature: 23 °C	Dew Point: 8 °C	Weather Conditions at Accident Site: Visual Conditions			
Wind Direction: 70		Wind Speed: 4		Wind Gusts:	
Visibility (RVR): 0 Ft.		Visibility (RVV) 0 SM			
Precip and/or Obscuration:					

Accident Information		
Aircraft Damage: Destroyed	Aircraft Fire: Ground	Aircraft Explosion: None

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	1				1
Other Ground	0	0	0		0
- GRAND TOTAL -	1	0	0		1

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Administrative Information

Investigator-In-Charge (IIC)

RICHARD B. PARKER

Additional Persons Participating in This Accident/Incident Investigation:

DAVID BUTLER
RENO, NV

BILL L ROGERS
EVERETT, WA

SKIP HOLM
VAN NUYS, CA

RICHARD P ALEY
WHITEFISH, MT