ASOS Research Brief

Research Request:

Learjet engine flameouts– Lear 20/30/40/50/60 series aircraft.

Research Response:

A search was conducted of the NTSB and FAA Accident Incident Database (AID) for all Learjet type aircraft with an engine flameout incident or accident. Results revealed only Lear 20 series aircraft experienced engine flameouts. A total of 16 events occurred due to various reasons, with no definitive trend. Thirteen of the reports were from the AID database, and contained very little supporting information. Most of the circumstances and reasons for the engine flameouts were unknown due to the limited information from the AID reports.

The Lear 20 series aircraft primarily use the General Electric CJ610 turbojet engine. This engine originally was derived from the military J85 engine, used in fighter aircraft. This engine was used in the Lear 23, 25, 28, and 29 models. Eventually the Lear 26 was installed with the Garret TFE731-2 turbofan engine which led to the development of the Lear 30 series aircraft.

Altitude

- 5 flameouts occurred between FL390 and FL410.
- 1 report occurred at 5,000ft.
- The altitude was not specified in 10 reports.

Single-Engine Flameouts

- 10 reports were single-engine flameouts.

Dual-Engine Flameouts

- 6 reports were dual-engine flameouts.

Engine Restart

- 5 reports stated an engine restart was successful. Only one restart was a dual engine flameout restart.
- 5 reports stated no restart was accomplished.
- An engine restart was not specified in 6 reports.

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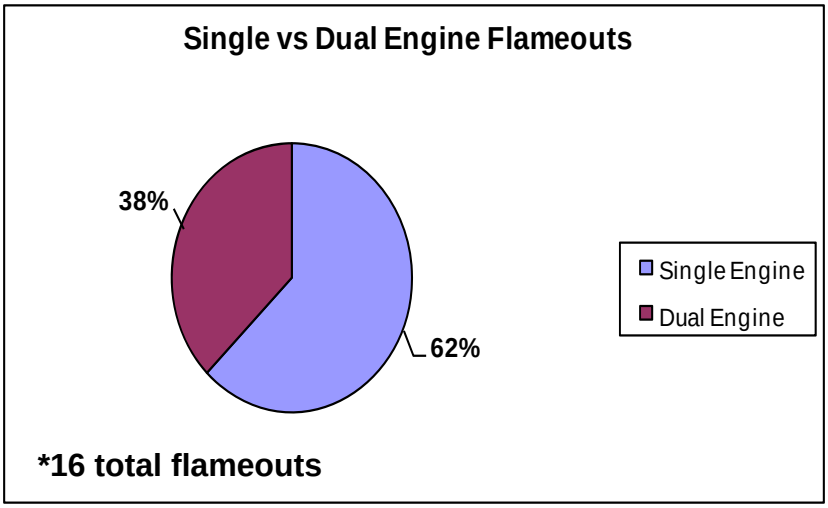
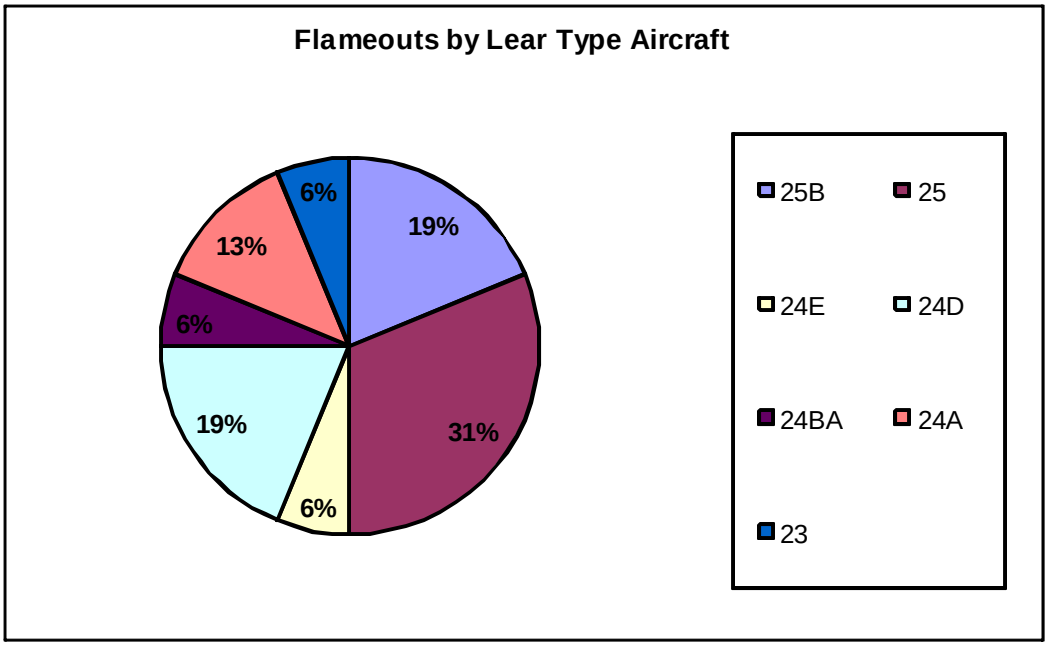
Research Results

Lear	Additional Info	Altitude	Single Engine	Dual Engine	Restart	Contributing Factor
25B		UKN	Yes		No	SUPPORT ARM FOR INLET HEAT DUCT SLIPPED, DEFLECTED AIR.
25B	Occurred on climbout	UKN		Yes	UKN	BIRD RESIDUE ON ENGINES. ENGINE AIRFLOW REDUCED
25B		390	Yes		UKN	MALFUNCTION OF FUEL CONTROL
25		410	Yes		Yes	UKN
25		UKN	Yes		Yes	UKN
25		390		Yes	UKN	UKN
25		UKN	Yes		No	INLET SENSE LINE UNINSULATED.
25		5000		Yes	No	UKN
24E		410		Yes	Yes	UKN
24D	Turbulence during climb in t-storm.	UKN		Yes	UKN	UKN
24D	Flight into severe weather			Yes	No	UKN
24D		UKN	Yes			BIRD STRIKE ON CLIMBOUT
24BA		UKN	Yes		No	STARTER GENERATOR HAD FAILED
24a	Turbulence	UKN	Yes		UKN	UKN
24a		UKN	Yes		UKN	SHEARED FUEL PUMP DRIVE
23		410	Yes		Yes	UKN

*UKN indicates ‘unknown’ - the data was not present





Sample NTSB Reports

TSB Identification: **NYC07LA170**.
The docket is stored in the Docket Management System (DMS). Please contact Records Management Division
Accident occurred Saturday, July 21, 2007 in St. Augustine, FL
Probable Cause Approval Date: 9/26/2008
Aircraft: Learjet 25, registration: N70SK
Injuries: 2 Uninjured.

About 5 miles from the destination airport, the flight was cleared by air traffic control to descend from its cruise altitude of 5,000 feet for a visual approach. As the first officer reduced engine power, both engines "quit." The captain attempted to restart both engines without success. He then took control of the airplane, and instructed the first officer to contact air traffic control and advise them that the airplane had experienced a "dual flameout." The captain configured the airplane by extending the landing gear and flaps and subsequently landed the airplane on the runway "hard," resulting in substantial damage to the airframe. Both engines were test run following the accident at full and idle power with no anomalies noted. Examination of the airplane revealed that it was equipped with an aftermarket throttle quadrant, and that the power lever locking mechanism pins as well as the throttle quadrant idle stops for both engines were worn. The power lever locking mechanism internal springs for both the left and right power levers were worn and broken. Additionally, it was possible to repeatedly move the left engine's power lever directly into cutoff without first releasing its power lever locking mechanism; however, the right engine's power lever could not be moved to the cut off position with-

out first releasing its associated locking mechanism. The right throttle thrust reverser solenoid installed on the airplane was found to be non-functional, but it is not believed that this component contributed to the accident. No explicit inspection or repair instructions were available for the throttle quadrant assembly. Other than the throttle quadrant issues, no other issues were identified with either the engines or airframe that could be contributed to both engines losing power simultaneously.
The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
A loss of power on both engines for an undetermined reason.

NTSB Identification: **CHI04FA029**.
The docket is stored in the Docket Management System (DMS). Please contact Records Management Division
Nonscheduled 14 CFR
Accident occurred Wednesday, November 12, 2003 in Belleville, IL
Probable Cause Approval Date: 1/13/2006
Aircraft: Learjet 24D, registration: N77JL
Injuries: 2 Minor, 2 Uninjured.
!!THIS CASE WAS MODIFIED JANUARY 12, 2006!!

The turbojet airplane was destroyed during a forced landing and post accident fire after a loss of power in both engines during takeoff climb. The pilot reported that both engines operated normally during taxi and pre-takeoff checks. He reported that, "We rotated positive rate gear up, V2 plus 30 flaps up, and at that point we struck birds taking No. 2 engine out. Upon losing No. 2 engine I advanced thrust levers forward and realized that the No. 1 engine was only producing approximately 70% RPM with EGT over read line." He executed a forced landing to a field and the crew and passengers evacuated the burning airplane. The copilot reported, "At approximately 500 to 1,000 ft. above ground level, I observed a large flock of birds straight ahead of us, and then passing just off our nose to the left side. I immediately heard an engine flameout. As I started to go to the checklist for single engine operations, I quickly realized that we were loosing airspeed and unable to maintain altitude. The PIC said we were going down and heading for the best emergency-landing stop." The Cockpit Voice Recorder (CVR) recorded the pilot stating, "We hit a bird," and the copilot stating, "Yep," immediately following the CVR recording a "sound similar to decrease in engine RPM." The inspection of the airplane's fuel system, pneumatic system, engines, fuel controls and fuel pumps revealed no pre-impact anomaly. No physical evidence of bird ingestion was found in either engine. A CVR sound spectrum plot and a flight profile analysis revealed that one engine flamed out almost immediately after the sound of a "thump" on the CVR. The other engine's speed decreased and experienced stalls until the engine speed was reduced to flight idle. The original engine certification tests indicated that compressor stalls occurred when a 2-4 ounce starling was shot ingested into the engine, but physical damage from bird ingestion was very slight due to the all steel construction and geometry of the engine. Engine flameouts, however, were not recorded during the certification tests. A wildlife specialist conducted a bird count at the accident airport two days after the accident occurred, and he reported counting a flock of about 800 European Starlings.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
The total loss of power to the right engine and the partial loss of power to the left engine after the airplane encountered a flock of birds during initial climb out, resulting in impeded ram induction airflow

NTSB Identification: **FTW90FA100** .
The docket is stored on NTSB microfiche number **47510.**
Accident occurred Wednesday, April 25, 1990 in UVALDE, TX
Probable Cause Approval Date: 3/12/1993
Aircraft: Learjet 25D, registration: XAROZ
Injuries: 9 Uninjured.

THE FLT CREW ENCTRD SVR TURBC IN CRUISE FLT AT FL410, OVER A VIP LVL 4 TO 5 THUNDERSTORM. THE #2 ENG FLAMED OUT, THOUGH CONTINUOUS IGNITION HAD BEEN SELECTED. AFTER THE FLAME-OUT, THE ACFT STARTED TO DSCND & THE CREW BGN TO DIVERT TO A NRBY ARPT. DRG THE DSCNT, THE ACFT ENCTRD LARGE HAIL, HVY RAIN, SVR TURBC, LIGHTNING & ST ELMOS FIRE. THE OTR ENG FLAMED OUT AS THE ACFT WAS DSCNDG THRU FL330 (PRESUMABLY DUE TO HAIL & WATER INGESTION). ATTEMPTED AIR STARTS (BOTH WINDMILLING & STARTER ASSISTED) WERE UNSUCCESSFUL; INTERIOR LGTS BCM EXTREMELY DIM DRG STARTER ASSISTED ATMTS. SUBSEQUENTLY, THE ACFT WAS DMGD DRG A LNDG IN A WHEAT FLD. INV REVEALED THE CREW DID NOT RCV A WX BRIEFING BFR THE FLT. THERE WAS A CONVECTIVE SIGMET (6C) & AN ALERT WX WARNING (AWW 163), WHICH WERE ACTIVE FOR THE AREA. ACCORDING TO A WX STUDY, THERE WAS A SVR THUNDERSTORM, TOPPED AT OR NR FL410, MDT TO SVR UP/DWNDFTS, LARGE HAIL, HVY RAIN, STRONG WIND GUSTS, AND AIRFRAME ICING ABV 12,000' MSL. ALL FRONTAL AREAS OF THE ACFT RCVD MDT TO SVR HAIL DMG.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
FAILURE OF THE PILOT TO OBTAIN A PRE-FLIGHT WEATHER BRIEFING, AND HIS IMPROPER IN-FLIGHT PLANNING/DECISION, WHICH RESULTED IN AN IN-FLIGHT ENCOUNTER WITH SEVERE WEATHER AND SUBSEQUENT ENGINE FLAMEOUTS. FACTORS RELATED TO THE ACCIDENT WERE: DARKNESS, THE SEVERE WEATHER CONDITIONS, AND ROUGH/UNEVEN TERRAIN IN THE FORCED LANDING AREA.