Aviation Investigation Final Report

Location:	DFW AIRPORT, Texas	**Incident Number:**	FTW96IA024
Date & Time:	October 24, 1995, 15:24 Local	**Registration:**	N263AT
Aircraft:	Aerospatiale ATR-72-212	**Aircraft Damage:**	Minor
Defining Event:		**Injuries:**	68 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

During normal cruise, the left engine experienced a 20% loss of torque. The crew was informed by company maintenance personnel that they might be experiencing a possible fuel nozzle leak on that engine. The #1 engine fire warning light illuminated, and the fire horn activated. The captain secured the engine and discharged the #1 fire suppression agent. Immediately following the discharge, the associated warning lights on the fire handle and condition lever extinguished. An uneventful single engine landing was completed and the passengers deplaned without further incident. Evidence of thermal damage was found in the aft section of the engine in the area of the lower turbine support case. Examination of the system revealed that 3 of the 144 'O' rings associated with the 14-nozzle fuel system were deteriorated or damaged. Also, during the investigation, testing at the engine manufacturer's facility revealed that the inside diameter of the copper gasket used at the fuel drain nipple was 30 to 40% larger than required. This resulted in misalignment and a leak at the fitting.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: 'O' ring failure in the fuel line to the left engine nozzle assemblies, which resulted in a fuel line leak and a left engine compartment fire.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings
1. FUEL SYSTEM,DRAIN - IMPROPER
2. (C) FUEL SYSTEM,LINE FITTING - FAILURE
3. (C) FUEL SYSTEM,LINE - LEAK

Occurrence #2: FIRE
Phase of Operation: CRUISE - NORMAL

Findings
4. (C) ENGINE COMPARTMENT - FIRE
5. FIRE EXTINGUISHING EQUIPMENT - SELECTED - PILOT IN COMMAND
6. ENGINE SHUTDOWN - PERFORMED - PILOT IN COMMAND

Factual Information

On October 24, 1995, at 1524 central daylight time, an Aerospatiale ATR 72-212, N263AT, registered to AMR Corporation, and operated by Simmons Airlines as flight 3588, on a Title 14 CFR Part 121 scheduled domestic flight, experienced an inflight fire on the #1 engine while on approach to the Dallas/Ft.Worth International Airport, Texas. The airplane sustained minor damage and there were no injuries to the 4 crewmembers or 64 passengers aboard the airplane. The flight originated in Oklahoma City, Oklahoma, at 1459. Visual meteorological conditions prevailed and an IFR flight plan was filed.

According to the operator, approximately 30 minutes short of the destination, the left engine experienced a 20% loss of torque. The flight crew contacted their maintenance operations center (MOC) and informed them of the cockpit indications they were experiencing. Company MOC informed the crew that they might be experiencing a possible fuel nozzle leak on that engine.

As the captain was discussing the possibility of an engine shut down with the first officer, the #1 fire warning light illuminated and the fire horn was activated. The captain secured the engine, and discharged the #1 fire agent. Immediately following the discharge of the fire suppression agent, the associated warning light in the fire handle and condition lever were extinguished.

At 1554 the airplane landed on Runway 13R at DFW Airport, with emergency equipment standing by. After clearing the runway, and stopping on the high speed taxiway to confirm that there was no engine fire, the airplane taxied to the ramp where the passengers deplaned without further incident.

An inspection of the #1 engine at the ramp did not reveal any thermal damage to the exterior; however, cowling removal revealed physical evidence of thermal damage in the aft section of the engine in the area of the lower turbine support case.

Two flexible fuel drain lines were found fire damaged and replaced. The 14 fuel nozzle assemblies, and the associated 144 "O" rings (Part number ST3367-009) were replaced. One "O" ring on the #3 fuel nozzle was found separated, and two "O" rings on the #12 nozzle were deteriorated. The system was leak tested following reinstallation and no fuel leaks were noted.

Testing at the engine manufacturer facility revealed that the inside diameter of the copper gasket used at the fuel drain nipple (Part Number 3023431) was found to be 30 to 40 percent larger than required. This oversize resulted in misalignment when the fitting is tightened, resulting in leaks.

The engine manufacturer issued service bulletin P&WC S.B. No. 21416 to replace the oversize gasket with one with a smaller inner diameter made of corrugated stainless steel (Part Number 3122594-01). The operator issued a Fleet Campaign Directive (FCD) to modify the affected airplanes.

The engine manufacturer is currently developing a redesigned fuel nozzle/manifold system for all the PW100 series of engines. A copy of their proposed system is enclosed.

According to the operator's maintenance records, the fuel nozzles were last replaced on July 3, 1995, at 6,855 hours. The upper flex line at the overboard drain mast had been previously inspected (boroscope) for blockage/clogging on September 27, 1995, at 7,343 hours, as per the operator's FCD # E2-71-001R2.

A review of the operator's maintenance practices, as well as the installation and inspection procedures involving the fuel distribution system for the PW127 engines were reviewed Federal Aviation Administration inspectors. No anomalies or deviations were found.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	May 16, 1995
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	19000 hours (Total, all aircraft), 270 hours (Last 90 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aerospatiale	**Registration:**	N263AT
Model/Series:	ATR-72-212 ATR 72-212	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	263
Landing Gear Type:	Retractable - Tricycle	**Seats:**	76
Date/Type of Last Inspection:	October 23, 1995 Continuous airworthiness	**Certified Max Gross Wt.:**	48500 lbs
Time Since Last Inspection:	2 Hrs	**Engines:**	2 Turbo prop
Airframe Total Time:	7498 Hrs	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	PW127-TM
Registered Owner:	AMR LEASING CORPORATION	**Rated Power:**	2750 Horsepower
Operator:	SIMMONS AIRLINES	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:	AMERICAN EAGLE	**Operator Designator Code:**	SIMA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	30 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	22°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	OKLAHOMA CITY , OK (OKC)	**Type of Flight Plan Filed:**	IFR
Destination:	DALLAS/FT WORTH, TX (DFW)	**Type of Clearance:**	IFR
Departure Time:	14:59 Local	**Type of Airspace:**	Class B

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	ILS
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	4 None	**Aircraft Damage:**	Minor
Passenger Injuries:	64 None	**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	68 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Casanova, Hector
Additional Participating Persons:	WILLIAM C MCGEE; DFW AIRPORT , TX JAMES R WINKLEY; DFW AIRPORT , TX
Original Publish Date:	July 3, 1996
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=19666