



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

707 1879

Date: May 15, 1987

In reply refer to: A-87-25

Honorable Donald D. Engen
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On December 5, 1985, a PA-31-350 airplane, N492SC, operated under 14 CFR Part 135 by Southcentral Air, Inc., experienced a collapse of the right main landing gear on landing rollout at Kenai, Alaska. ^{1/} The flight departed Homer, Alaska, and diverted to Kenai after the pilot was unable to retract the landing gear. The pilot and five passengers were not injured, but the airplane sustained minor damage.

The onsite examination of the airplane revealed that the right main landing gear side link assembly (part number (P/N) 40279) had separated at the pivoting end of the link through the 1.312-inch inside diameter pivot lug. Metallurgical examination revealed that the link had failed due to fatigue cracks that initiated at the bottom of the lug. The fatigue origins were at the edge of each fillet radius that blends the arm into the pivot lug.

Federal Aviation Administration's (FAA) Service Difficulty Reports (SDR) for July 7, 1980, to March 17, 1987, listed 18 failures of P/N 40279, the basic part number, and 6 similar failures of the part on other variations of the basic part number for a total of 24 failures of the link assembly. The other variations of the part number were not listed in the airplane's illustrated list and their source could not be determined; however, Safety Board analysts believe that the other parts in the FAA data system are the same link assembly.

Since the incident involving N492SC, Southcentral Air, Inc., found an additional cracked link assembly on a PA-31 airplane, N302SC, during a scheduled inspection on August 7, 1986. The link had been in service 515 hours and had operated 1,500 cycles.

The manufacturer stated that it was aware of a total of 19 link assembly failures identical to the failure on N492SC out of a population of about 5,038 aircraft; that is, 10,076 links, for a failure rate of about 0.19 percent. The lowest time failure occurred at 2,187 hours in-service and the highest time failure occurred at 12,500 hours in-service.

As a result of the link assembly failure, on August 18, 1986, Piper issued Service Bulletin No. 845 on the link assembly, main landing gear side brace, for the PA-31 series airplanes. The bulletin recommended that operators inspect the interior fillet area of the link for cracks initially at 1,000 hours and repetitively at 1,000 hours and repetitively at

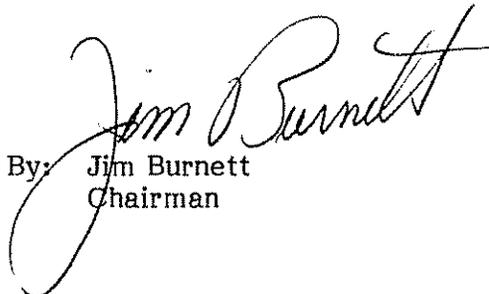
^{1/} NTSB Incident Brief: File No. 5061.

100-hour intervals. The inspection procedures describe a crack and specify limits. If cracking is found, Piper recommends that the link be replaced. The bulletin advises operators of Piper's involvement in the testing of a new link assembly which will, according to Piper, "relieve the repetitive inspection requirements" of Service Bulletin 845. Piper stated that replacement parts are machined with large radii and are shot peened for improved fatigue life capability.

The FAA has issued no airworthiness directives on this link assembly. However, in view of the potentially serious consequences of collapsed landing gears following a link failure, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to make mandatory the inspection requirements of Piper Aircraft Corporation Service Bulletin No. 845 and to require the immediate one-time inspection of all affected PA-31 link assemblies, P/N 40279, in accordance with the methods described in the service bulletin. Also, clarify and disseminate to operators crack recognition criteria and more specific cracking limits beyond which replacement of the link is required. (Class II, Priority Action) (A-87-25)

BURNETT, Chairman, GOLDMAN, Vice Chairman, LAUBER and NALL, Members concurred in this recommendation.


By: Jim Burnett
Chairman

Brief of Incident

File No. - 5061 12/05/85 KENAI, AK A/C Reg. No. N492SC Time (Lcl) - 1258 AST

---Basic Information---
 Type Operating Certificate-COMMUTER
 Name of Carrier -SOUTH CENTRAL AIR, INC.
 Type of Operation -SCHEDULED, DOMESTIC, PASSENGER
 Flight Conducted Under -14 CFR 135
 Incident Occurred During -LANDING

Aircraft Damage Injuries
 MINOR Fatal Serious Minor None
 Fire 0 0 0 1
 NONE 0 0 0 5
 Crew Pass

---Aircraft Information---
 Make/Model - FIFER NAVAJO PA-31-350
 Landing Gear - TRICYCLE-RETRACTABLE
 Max Gross Wt - 7200
 No. of Seats - 10

ELT Installed/Activated - YES/NO
 Stall Warning System - YES

---Environment/Operations Information---
 Weather Data
 Wx Briefing - COMPANY
 Method - IN PERSON
 Completeness - WEATHER NOT PERTINENT
 Basic Weather - VMC
 Wind Dir/Speed- 190/005 KTS
 Visibility - 90.0 SM
 Lowest Sky/Clouds - CLEAR
 Lowest Ceiling - NONE
 Obstructions to Vision- NONE
 Precipitation - NONE
 Condition of Light - DAYLIGHT

Airport Proximity
 ON AIRPORT

Itinerary
 Last Departure Point
 HOMER, AK
 Destination
 SAME AS ACC/INC
 ATC/Airspace
 Type of Flight Plan - IFR
 Type of Clearance - IFR
 Type Apch/Lndg - STRAIGHT-IN

Airport Data
 KENAI
 Runway Ident - 01
 Runway Lth/Wid - 7600/ 150
 Runway Surface - ASPHALT
 Runway Status - SNOW - COMPACTED

---Personnel Information---
 Pilot-In-Command
 Certificate(s)/Rating(s)
 ATP
 SE LAND, ME LAND

Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT
 Flight Time (Hours)
 Total - 3678 Last 24 Hrs - 9
 Make/Model - 796 Last 30 Days - UNK/NR
 Instrument - 450 Last 90 Days - 316
 Multi-Eng - 3471

Instrument Rating(s) - AIRPLANE

---Narrative---
 THE PILOT IN COMMAND COULD NOT RAISE THE LANDING GEAR PROPERLY AFTER DEPARTURE. HE DIVERTED TO KENAI, ALASKA, WHERE UPON EXTENDING THE GEAR HE OBTAINED THREE SAFE GEAR INDICATIONS. THE PILOT LANDED THE AIRPLANE AND UPON ROLL OUT THE LEFT MAIN GEAR COLLAPSED. METALLURGICAL EXAMINATION OF THE RIGHT MAIN GEAR LANDING GEAR LINK ASSEMBLY, FN 40279, REVEALED FATIGUE CRACKS IN THE INSIDE RADIUS OF THE FILLET IN THE CLEVIS END.

Brief of Incident (Continued)

File No. - 5061 12/05/85 KENAI,AK A/C Reg. No. N492SC Time (Lcl) - 1258 AST

Occurrence MAIN GEAR COLLAPSED
Phase of Operation LANDING - ROLL

Finding(s)

1. LANDING GEAR, MAIN GEAR - FAILURE, PARTIAL
2. LANDING GEAR - INADEQUATE - MANUFACTURER
3. AIRCRAFT/EQUIPMENT, INADEQUATE DESIGN - MANUFACTURER
4. INSUFFICIENT STANDARDS/REQUIREMENTS, MANUFACTURER - FAA (ORGANIZATION)

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this incident is/are finding(s) 1,3

Factor(s) relating to this incident is/are finding(s) 2,4