LOG 2511

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: September 13, 1994

In reply refer to: A-94-170

Honorable David R. Hinson
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On October 27, 1993, shortly after departing the Reno Cannon International Airport, Reno, Nevada, a Beech Model 200 airplane, N191FL, sustained an electrical fire causing the cockpit and cabin to fill with smoke. The pilot reported that the smoke became progressively more intense, greatly restricted visibility in the cockpit and made breathing increasingly difficult. To facilitate removal of the smoke, he opened the cabin pressurization dump valve and the storm window. He estimated that one additional minute of in-flight operation would have resulted in incapacitation.

The pilot returned the airplane to the airport with the landing gear jammed and only partially extended. The landing gear collapsed on touchdown and the airplane was substantially damaged, but none of the five persons aboard were injured. The Safety Board's investigation of the accident disclosed that the fire emanated from the electrical landing gear motor and wiring because of excessive current flow. Radiant heat from the fire had partially melted the cockpit floor.

During postaccident inspection, the right main landing gear actuator assembly was found jammed in an intermediate position. The jammed actuator apparently precipitated the fire when it slowed or stalled the electric motor. Disassembly of the actuator disclosed that two gear teeth had broken and separated from the actuator screw housing ring gear. One of the broken teeth was lodged between the ring gear and the electric motor-driven pinion gear. The actuator assembly had been removed and overhauled recently and had been in service for only 12 hours since it was reinstalled. According to the Beech Aircraft Corporation, the actuator had been reassembled with inadequate shimming, resulting in insufficient end play and excessive side loads on the gear teeth.

Beech Mandatory Service Bulletin No. 2035, Rev. II, "Electrical Power - Installation of a Circuit Breaker on the Landing Gear Motor Control Panel Assembly" was issued in August

1990, to provide for replacement of existing 200 ampere landing gear motor circuit breakers with 60 ampere circuit breakers. The reason for the change, according to Beech, was to provide a circuit breaker that will open before the landing gear power system motor is damaged in a manner restricting the operation of the manual landing gear extension system. The bulletin, applicable to approximately 2,276 airplanes, including the 99 series, King Air F90 and 100 series, and Super King Air 200 and 300 series airplanes, has, thus far, been accomplished on about 1,629 airplanes. It had not been accomplished on N191FL. In view of the above accident circumstances, the Safety Board believes that the 60 ampere landing gear motor circuit breakers should be installed on all of the affected airplanes.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive requiring compliance with Beechcraft Service Bulletin No. 2035, Rev. II, within the next 100 hours time-in-service or at the next scheduled inspection, whichever occurs first. (Class II, Priority Action) (A-94-170)

Acting Chairman HALL, and Members LAUBER, HAMMERSCHMIDT, and VOGT concurred in this recommendation.

By: Jim Hall
Acting Chairman

National Transport Safety Board
Washington, D.C. 20594

Brief of Accident

File No. - 1742 10/27/93 RENO,NV A/C Reg. No. N191FL Time (Lcl) - 2315 PDT

----Basic Information----
Type Operating Certificate-NONE (GENERAL AVIATION)

Type of Operation -PERSONAL
Flight Conducted Under -14 CFR 91
Accident Occurred During -TAKEOFF

Aircraft Damage
SUBSTANTIAL
Fire
IN FLIGHT

	Injuries			
	Fatal	Serious	Minor	None
Crew	0	0	0	1
Pass	0	0	0	4

----Aircraft Information----
Make/Model - BEECH 200
Landing Gear - TRICYCLE-RETRACTABLE
Max Gross Wt - 12500
No. of Seats - 8

Eng Make/Model - P&W PT6A-42
Number Engines - 2
Engine Type - TURBOPROP
Rated Power - 850 HP

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

----Environment/Operations Information----
Weather Data
Wx Briefing - UNK/NR
Method - UNK/NR
Completeness - UNK/NR
Basic Weather - VMC
Wind Dir/Speed- 250/003 KTS
Visibility - 20.0 SM
Lowest Sky/Clouds - CLEAR
Lowest Ceiling - NONE
Obstructions to Vision- NONE
Precipitation - NONE
Condition of Light - NIGHT(DARK)

Itinerary
Last Departure Point
SAME AS ACC/INC
Destination
SAN CARLOS,CA

ATC/Airspace
Type of Flight Plan - NONE
Type of Clearance - VFR
Type Apch/Lndg - TRAFFIC PATTERN
FORCED LANDING

Airport Proximity
ON AIRPORT

Airport Data
RENO CANNON INTL
Runway Ident - 25
Runway Lth/Wid - 6101/ 150
Runway Surface - ASPHALT
Runway Status - DRY

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

Age - 29
Biennial Flight Review
Current - YES
Months Since - 10
Aircraft Type - UNK/NR

Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT

Flight Time (Hours)
Total - 1000
Make/Model- 23
Instrument- UNK/NR
Multi-Eng - 700
Last 24 Hrs - UNK/NR
Last 30 Days- UNK/NR
Last 90 Days- 60
Rotorcraft - 27

Instrument Rating(s) - NONE

----Narrative----
AFTER MOVING THE LANDING GEAR HANDLE TO THE UP POSITION, THE COCKPIT BEGAN FILLING WITH SMOKE. THE PILOT NOTICED THAT THE GEAR APPEARED TO BE HUNG IN AN INTRANSIT POSITION. THE SMOKE, WHICH SMELLED OF BURNING ELECTRICAL INSULATION, BECAME HEAVIER, AND HEAT COULD BE FELT ON THE COCKPIT FLOOR. THE PILOT RETURNED TO THE AIRPORT, AND THE GEAR COLLAPSED DURING LANDING. EXAMINATION REVEALED THAT THE LANDING GEAR MOTOR AND ASSOCIATED WIRING WERE BURNED, AND THE COCKPIT FLOORING APPEARED TO BE PARTIALLY MELTED. THE RIGHT LANDING GEAR ACTUATOR WAS FOUND TO HAVE BEEN IMPROPERLY OVERHAULED, WHICH RESULTED IN THREE GEAR TEETH BREAKING AND JAMMING THE ACTUATOR. BEECH MANDATORY SERVICE BULLETIN NO. 2035, REV. II, REQUIRING REPLACEMENT OF THE 200-AMP GEAR MOTOR CIRCUIT BREAKER WITH A 60-AMP BREAKER TO PREVENT GEAR MOTOR DAMAGE, WAS NOT ACCOMPLISHED ON THIS AIRPLANE.

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Occurrence #1 AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation TAKEOFF - INITIAL CLIMB

Finding(s)
1. LANDING GEAR,NORMAL RETRACTION/EXTENSION ASSEMBLY - FAILURE,PARTIAL
2. MAINTENANCE,OVERHAUL - IMPROPER - OTHER MAINTENANCE PSNL
3. LANDING GEAR,NORMAL RETRACTION/EXTENSION ASSEMBLY - JAMMED

Occurrence #2 FIRE
Phase of Operation TAKEOFF - INITIAL CLIMB

Finding(s)
4. ELECTRICAL SYSTEM,ELECTRIC MOTOR - OVERLOAD
5. MAINTENANCE,SERVICE BULLETINS - NOT PERFORMED - COMPANY/OPERATOR MGMT
6. ELECTRICAL SYSTEM,ELECTRIC MOTOR - FIRE
7. ELECTRICAL SYSTEM,ELECTRIC WIRING - FIRE

Occurrence #3 FORCED LANDING
Phase of Operation LANDING - FLARE/TOUCHDOWN

Occurrence #4 MAIN GEAR COLLAPSED
Phase of Operation LANDING - ROLL

----Probable Cause----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was:
THE IMPROPER OVERHAUL OF THE RIGHT MAIN LANDING GEAR ACTUATOR BY MAINTENANCE PERSONNEL, AND THE OPERATOR'S FAILURE TO ASSURE THAT THE AIRPLANE MANUFACTURER'S MANDATORY SERVICE BULLETIN REQUIRING MODIFICATION OF THE GEAR MOTOR CIRCUIT PROTECTION WAS ACCOMPLISHED.