



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 3, 1993

In reply refer to: A-93-65

Mr. Joseph M. Del Balzo
Acting Administrator
Federal Aviation Administration
Washington, D.C. 20591

On August 7, 1992, a 1976 Rockwell International Model 112TC airplane, N30MT, lost engine power during an approach to land at the Winner/Bob Wiley Airport, Winner, South Dakota. The airplane was powered by a Lycoming Model IO-360-C1A6D engine, which had accumulated a total operating time of 1,065 hours. The pilot attempted to make an emergency landing on a gravel road adjacent to the airport, but the airplane struck a fence and an embankment short of the intended touchdown point. The airplane, which was being operated under 14 CFR Part 91, was substantially damaged, but the three occupants aboard suffered only minor injuries. Subsequent investigation disclosed that the loss of power occurred when the shaft retaining screw on the Marvel-Schebler Model HA-6 carburetor's rotary mixture control failed due to excessive wear. This allowed the loose mixture control to vibrate out of its proper position and reduce or disrupt fuel flow to the engine.

An accident precipitated by a similar failure occurred on August 23, 1991, about 55 miles southwest of Fredonia, Arizona, involving a 1978 Cessna Model R182, N9067C. The airplane, which was being operated in connection with an aerial observation flight under 14 CFR Part 135, was powered by a Lycoming Model O-540-J3C5D engine, which had been overhauled 485 flight hours prior to the accident and had accumulated a total operating time of 2,568 hours. During cruise, a loss of engine power occurred, and the pilot was forced to land on an isolated dirt road. During the landing rollout, the airplane collided with adjacent terrain and was substantially damaged, but none of the four occupants aboard were injured. While the Marvel Schebler Model HA-6 carburetor was being removed from the engine for examination, the rotary mixture control fell out of the carburetor housing because of a broken shaft retaining screw. The airplane had been subject to a 100-hour inspection on August 22, 1991, 4.7 flight hours before the accident.

In September 1978, Marvel-Schebler/Tillotson (the original manufacturer of the Model HA-6 carburetor) issued Service Bulletin (SB) No. A1-78, "Improved Retaining Method for Mixture Control Assembly on Model HA Carburetors With Rotary Mixture Control," and recommended that it be complied with at the next inspection or as soon as possible. This SB, which had not been accomplished on either N30MT or N9067C, provides for the installation of a spring retainer to counteract end-play wear on the mixture control assembly and retaining screw due to vibration. Moreover, the spring, which can be installed without removing the carburetor from the engine, serves as an additional means of retaining the rotary mixture control even if the existing shaft retaining screw is worn or broken. Marvel-Schebler Model HA-6 carburetors are incorporated exclusively on Lycoming engines installed in a wide variety of both single and twin-engine airplanes. In December 1978, Avco Lycoming issued Service Instruction No. 1370, "Carburetor Mixture Control Retainer," recommending that the spring retainer be installed on all Model HA-6 carburetors with rotary mixture controls at the next overhaul or sooner at the owner's discretion.

In February 1978, Marvel-Schebler began installing the spring retainers on all newly manufactured Model HA-6 carburetors and, shortly thereafter, changed the design of the mixture control retention assembly. The present manufacturer of these carburetors, Precision Airmotive Corporation, estimates that the Model HA-6 carburetors were manufactured at the rate of approximately 1,500 units per year from mid-1971 to February 1978, but has been unable to provide any estimate as to the number of carburetors that may have had the spring retainers installed in accordance with Marvel-Schebler SB No. A1-78.

In addition to the worn and broken carburetor mixture control retaining screws evidenced above, several service difficulty reports have also been submitted to the Federal Aviation Administration (FAA) referring to similar problems on other Marvel-Schebler Model HA-6 carburetors. In order to preclude the possibility of serious or fatal injuries as a result of a recurrence of accidents similar to those involving N30MT and N9067C, the Safety Board believes that the FAA should issue an airworthiness directive requiring that mixture control spring retainers be installed on these carburetors.

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

Issue an Airworthiness Directive applicable to all Marvel-Schebler Model HA-6 carburetors manufactured prior to February 1978, requiring the installation of rotary mixture control spring retainers, unless previously accomplished, in accordance with Marvel-Schebler/Tillotson Service Bulletin No. A1-78. Compliance should occur at the next 100-hour or annual

inspection, whichever occurs first. (Class II, Priority Action) (A-93-65)

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in this recommendation.



By: Carl W. Vogt
Chairman

Brief of Accident

File No. - 2295 8/07/92 WINNER,SD A/C Reg. No. N30MT Time (Lcl) - 1350 CDT

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

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

-----Aircraft Information-----
Make/Model - ROCKWELL INTL 112TC
Landing Gear - TRICYCLE-RETRACTABLE
Max Gross Wt - 2800
No. of Seats - 4

-----Environment/Operations Information-----

Weather Data
Wx Briefing - FSS
Method - TELEPHONE
Completeness - WEATHER NOT PERTINENT
Basic Weather - VMC
Wind Dir/Speed- 240/004 KTS
Visibility - 20.0 SM
Lowest Sky/Clouds - N/A
Lowest Ceiling - 2000 FT BROKEN
Obstructions to Vision- NONE
Precipitation - NONE
Condition of Light - DAYLIGHT

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

Instrument Rating(s) - AIRPLANE

-----Narrative-----
DRG A LNDG GO-AROUND, THE ENG BGN RUNNING ROUGH, THEN LOST PWR, AN ATTEMPT WAS MADE TO MAKE AN EMERG LNDG ON A ROAD ADJACENT TO THE ARPT, BUT THE ACFT HIT A FENCE & AN EMBANKMENT BEFORE REACHING IT. AN INV REVEALED THE LOSS OF POWER WAS DUE TO A MALFUNCTION OF THE ENG'S MARVEL-SCHEBLER MODEL HA-6 CARBURETOR (CARB). EXCESSIVE WEAR OF THE SHAFT RETAINING SCREW ALLOWED MISPOSITIONING OF THE CARB'S ROTARY MIXTURE CONTROL (PN 242-541) AND BLOCKAGE OF FUEL FLOW. IN SEP 78, MARVEL-SCHEBLER/TILLOTSON (ORIGINAL MANUFACTURER OF THE CARB) ISSUED SVC BULLETIN (SB) #A1-78, BUT IT HAD NOT BEEN ACCOMPLISHED. THE SB PROVIDES FOR INSTLN OF A SPRING RETAINER (PN 55-A239) TO COUNTERACT END-PLAY WEAR ON THE MIXTURE CONTROL ASSEMBLY & RETAINING SCREW DUE TO VIBRATION. THE SPRING RETAINER ALSO SERVES AS AN ADNL MEANS OF RETAINING THE ROTARY MIXTURE CONTROL, EVEN IF THE EXISTING SHAFT RETAINING SCREW IS WORN OR BKN. THE ENG HAD A TOTAL FLT TIME OF 1065 HRS & 27 HRS SINCE THE LAST INSPN.

Aircraft Damage
SUBSTANTIAL
Fire NONE
Fatal 0
Serious 0
Minor 1
Injuries 2
Crew Pass 0
None 0

Eng Make/Model - LYCOMING IO-360
Number Engines - 1
Engine Type - RECIPROCATING-CARBURETOR
Rated Power - 210 HP
ELT Installed/Activated - YES/YES
Stall Warning System - YES

Itinerary
Last Departure Point
BEATRICE, NE
Destination
WINNER, SD

Airport Proximity
OFF AIRPORT/STRIP
Airport Data
BOB WILEY FIELD - 13
Runway Ident - 13
Runway Lth/Wid - 3900/
Runway Surface - ASPHALT
Runway Status - DRY

Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT
Flight Time (Hours)
Total - 3181
Make/Model - 715
Instrument - 491
Multi-Eng - 173
Last 24 Hrs - 2
Last 30 Days - 34
Last 90 Days - 42
Rotorcraft - UNK/NR

Brief of Accident (Continued)

File No. - 2295 8/07/92 WINNER, SD A/C Reg. No. N30MT Time (Lcl) - 1350 CDT

Occurrence #1 LOSS OF ENGINE POWER
Phase of Operation GO-AROUND (VFR)

Finding(s)

1. MAINTENANCE, SERVICE BULLETINS - NOT FOLLOWED --
2. FUEL SYSTEM, CARBURETOR - FAILURE, TOTAL
3. MIXTURE CONTROL - LOOSE

Occurrence #3 ON GROUND COLLISION WITH OBJECT
Phase of Operation LANDING

Finding(s)

4. OBJECT - FENCE

Occurrence #4 ON GROUND COLLISION WITH TERRAIN/WATER
Phase of Operation LANDING

Finding(s)

5. TERRAIN CONDITION - ROUGH/UNEVEN

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was:
FAILURE OF THE CARBURETOR MIXTURE CONTROL, RESULTING IN LOSS OF ENGINE POWER. A FACTOR RELATED TO THE ACCIDENT WAS:
LACK OF COMPLIANCE WITH MARVEL-SCHEBLER SERVICE BULLETIN (SB) #A1-78.

Brief of Accident

File No. - 1644 8/23/91 FREDONIA, AZ A/C Reg. No. N9067C Time (Lcl) - 1010 MST

-----Basic Information-----
 Type Operating Certificate-ON-DEMAND AIR TAXI Aircraft Damage Injuries None
 Name of Carrier -LAKE POWELL AIR SERVICE SUBSTANTIAL Fatal Serious Minor 1
 Type of Operation -NON SCHED, DOMESTIC, PASSENGER Fire Crew 0 0 0 3
 Flight Conducted Under -14 CFR 135 NONE Pass 0 0 0 3
 Accident Occurred During -LANDING

-----Aircraft Information-----
 Make/Model - CESSNA R182 Eng Make/Model - LYCOMING O-540-J3C5D ELT Installed/Activated - YES/YES
 Landing Gear - TRICYCLE-RETRACTABLE Number Engines - 1 Stall Warning System - YES
 Max Gross Wt - 3100 Engine Type - RECIPROCATING-CARBURETOR
 No. of Seats - 4 Rated Power - 235 HP

-----Environment/Operations Information-----
 Weather Data Wx Briefing - NO RECORD OF BRIEFING Itinerary Airport Proximity
 Method - N/A Last Departure Point LAS VEGAS, NV OFF AIRPORT/STRIP
 Completeness - N/A Destination MARBLE CANYON, AZ Airport Data
 Basic Weather - VMC ATC/Airspace Runway Ident - N/A
 Wind Dir/Speed - 070/010 KTS Type of Flight Plan - COMPANY (VFR) Runway Lth/Wid - N/A
 Visibility - 60.0 SM Type of Clearance - VFR Runway Surface - N/A
 Lowest Sky/Clouds - NONE Type Apch/Lndg - FORCED LANDING Runway Status - N/A
 Obstructions to Vision- NONE
 Precipitation - NONE
 Condition of Light - DAYLIGHT

-----Personnel Information-----
 Pilot-In-Command Age - 29 Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT
 Certificate(s)/Rating(s) Biennial Flight Review Flight Time (Hours)
 COMMERCIAL Current - YES Total - 1765 Last 24 Hrs - 6
 SE LAND, ME LAND Months Since - 2 Make/Model- 15 Last 30 Days- 107
 Aircraft Type - C-T207A Instrument- 149 Last 90 Days- 243
 Multi-Eng - 163 Rotorcraft - 15

Instrument Rating(s) - AIRPLANE

-----Narrative-----
 THE PLT & 3 PSGRS WERE ON A X-COUNTRY SIGHTSEEING FLT, WHEN THE ENG BGN TO RUN ROUGH, THEN LOST PWR. SUBSEQUENTLY, THE ACFT COLLIDED WITH TRRN DRG A FORCED LANDING & HIT A TREE BFR IT CAME TO REST. WHEN CHECKED AFTER THE ACNT, THE ENG WOULD RUN, BUT ONLY AT IDLE. THE ENG WAS EQUIPPED WITH A MARVEL-SCHEBLER MODEL HA-6 CARBURETOR (CARB). AS THE CARB WAS BEING REMOVED FM THE ENG FOR EXAMINATION, THE ROTARY MIXTURE CONTROL (PN 242-541) FELL OUT OF THE CARB HOUSING BECAUSE THE SHAFT RETAINING SCREW HAD BKN. IN SEP 78, MARVEL-SCHEBLER/TILLOTSON (ORIGINAL MANUFACTURER OF THE CARB) ISSUED SVC BULLETIN (SB) #A1-78, BUT IT HAD NOT BEEN ACCOMPLISHED. THE SB PROVIDES FOR INSTLN OF A SPRING RETAINER (PN 55-A239) TO COUNTERACT END-PLAY WEAR ON THE MIXTURE CONTROL ASSEMBLY & RETAINING SCREW DUE TO VIBRATION. THE SPRING RETAINER ALSO SERVES AS AN ADNL MEANS OF RETAINING THE ROTARY MIXTURE CONTROL, EVEN IF THE EXISTING SHAFT RETAINING SCREW IS WORN OR BKN. THE ENG HAD A TOTAL OPERG TIME OF 2568 HRS, 485 HRS SINCE OVERHAUL & 4.7 HRS SINCE THE PREVIOUS 100 HR INSPN.

Brief of Accident (Continued)

File No. - 1644 8/23/91 FREDONIA, AZ A/C Reg. No. N9067C Time (Lcl) - 1010 MST

Occurrence #1 LOSS OF ENGINE POWER
Phase of Operation CRUISE - NORMAL

Finding(s)
1. MAINTENANCE, SERVICE BULLETINS - NOT FOLLOWED - COMPANY MAINTENANCE PSNL
2. FUEL SYSTEM, CARBURETOR - FAILURE, TOTAL
3. MIXTURE CONTROL - LOOSE

Occurrence #3 IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation LANDING

Finding(s)
4. TERRAIN CONDITION - ROUGH/UNEVEN

Occurrence #4 ON GROUND COLLISION WITH OBJECT
Phase of Operation LANDING

Finding(s)
5. OBJECT - TREE(S)

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was:
FAILURE OF THE CARBURETOR MIXTURE CONTROL, RESULTING IN LOSS OF ENGINE POWER. A FACTOR RELATED TO THE ACCIDENT WAS:
LACK OF COMPLIANCE WITH MARVEL-SCHEBLER SERVICE BULLETIN (SB) #A1-78.