AIRCRAFT ACCIDENT REPORT

McCAULEY AVIATION, INC.
MITSUBISHI MU-2B, N72B,
NEAR JEFFERSONVILLE, GEORGIA
MARCH 24, 1983

NTSB/AAR-84/01
## Abstract

At 0226 eastern standard time on March 24, 1994, McCauley Flight 354, a Mitsubishi MU-2B, N725, operated as a scheduled air taxi cargo flight from Jacksonville, Florida, to Atlanta, Georgia, by McCauley Aviation, Inc., Pine Bluff, Arkansas, crashed into a wooded area 6 nautical miles south of Jeffersonville, Georgia, killing the pilot and his three non revenue passengers. In the area of the crash there were light rain showers with ceilings of 2,000 feet and the surface visibility was 5 miles. The cloud extended to above 17,000 feet.

The National Transportation Safety Board determined that the probable cause of this accident was the uncontrolled descent of the airplane for undetermined reasons and the over stress and breakup of the airplane structure during an attempted recovery by the pilot.
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At 0836 Eastern Standard Time on March 24, 1963, McCauley Flight 354, a Mississippi MU-2B, N732E, operated as a scheduled air taxi/cargo flight from Jacksonville, Florida, to Atlanta, Georgia, by McCauley Aviation, Inc., Pine Bluff, Arkansas, crashed into a wooded area 5 nautical miles south of Jeffersonville, Georgia, killing the pilot and his three nonrevenue passengers. In the area of the crash there were light rain showers with ceilings of 2,000 feet and the surface visibility was 8 miles. The clouds extended to about 17,000 feet.

The National Transportation Safety Board determines that the probable cause of this accident was the uncontrolled descent of the airplane for undetermined reasons and the overstress and breakage of the airplane structure during an attempted recovery by the pilot.

1. FACTUAL INFORMATION

14. History of the Flight

The flight was the return leg to Memphis of a regularly scheduled, nonstop four-leg round trip between Memphis, Atlanta, and Jacksonville. The purpose was to transport unconverted checks between those cities under a contract between McCauley Aviation and the Federal Reserve Bank of Chicago. The pilot was accompanied on the flight by his wife and two daughters, aged 9 and 4, with the permission of company management.

The flight operated Monday through Friday on the following schedule:

<table>
<thead>
<tr>
<th>Flight No.</th>
<th>Departure</th>
<th>From</th>
<th>To</th>
<th>Arrival</th>
</tr>
</thead>
<tbody>
<tr>
<td>352</td>
<td>2145 est</td>
<td>Memphis</td>
<td>Atlanta</td>
<td>0115 est</td>
</tr>
<tr>
<td>353</td>
<td>0045 est</td>
<td>Atlanta</td>
<td>Jacksonville</td>
<td>1010 est</td>
</tr>
<tr>
<td>354</td>
<td>0215 est</td>
<td>Jacksonville</td>
<td>Atlanta</td>
<td>1820 est</td>
</tr>
<tr>
<td>355</td>
<td>0845 est</td>
<td>Atlanta</td>
<td>Memphis</td>
<td>1715 est</td>
</tr>
</tbody>
</table>

The Mississippi MU-2B-90 is a twin-engine, high-wing aircraft capable of carrying a normal payload of up to six passengers and two pilots. It is manufactured by the Mississippi MU-2B-90 company.

2/ All time herein are Eastern Standard Time based on the 24-hour clock system, otherwise stated as Central Standard Time (CST).
On March 23, 1963, the pilot and passengers flew from Pine Bluff, Arkansas, to Memphis, Tennessee, in another airplane operating as McCaulay Flight 354. While on route from Pine Bluff, the pilot received a weather briefing at 2140 by radio from the Little Rock, Arkansas, Flight Service Station (FRS). The briefing included the current weather for Memphis, Atlanta, and Jacksonville, and the terminal forecast for Atlanta.

N71B departed Memphis on schedule as McCaulay Flight 354, with a full fuel load of 494 gallons of jet A turbine fuel. The normal McCaulay practice was to depart Memphis with full tanks and refuel at Atlanta before departure to Memphis. The flights to Atlanta and Jacksonville and the cargo transfer at both stops were accomplished without incident. N71B departed Jacksonville at 0200 on an instrument flight rules (IFR) flight plan as McCaulay Flight 354 with 220 pounds of cargo and an estimated 220 gallons of fuel on board.

According to the agent who transferred the cargo at Jacksonville, the pilot appeared to be alert and in good spirits and acted normally. The pilot's wife and children departed during the stop and would have boarded the aircraft occupied the third personnel seat and the pilot's wife occupied the right front seat.

Jacksonville Air Route Traffic Control Center (ARTCC) assigned McCaulay Flight 354 to cruise at flight level (FL) 200 to Atlanta via Airways J-45. The magnetic course of J-45 is 320°. At about 0200, the pilot of Flight 354 requested and received controller approval to remain at flight level 140; also at the pilot's request, the controller then cleared Flight 354 direct to Atlanta. At 0224:57, a radar hardoff for Flight 354 was accomplished between traffic controllers of the Jacksonville and Atlanta Centers. At 0225:12, Flight 354 contacted the Atlanta ARTCC controller and reported at flight level 140; this was Flight 354's last transmission. During the early morning hours when traffic volume is low, Atlanta Center operated using a backup computer while the primary computer was out of service for normal scheduled maintenance. The backup computer had limited data display capability and no data recording capability. The data block displayed with a radar target is limited to only transponder code and altitude. At 0230, the radar controller observed a radar target with limited data block; it displayed the transponder code assigned to Flight 354 and passed the March VOR 604 northwesterly course. According to the controller, the target disappeared from the radar screen about 10 nautical miles north of the VOR. The controller radioed a clearance for Flight 354 to descend to 11,000 feet but received no reply. He then attempted unsuccessfully to establish radio contact.

Several persons in the area south and east of Jeffersonville, Georgia, reported hearing sounds of an airplane engine alternately at high speeds then diminishing. Some reported it as a loud, high-pitched whining that suddenly stopped; it was followed by cracking sounds. The airplane wreckage later was found scattered over a small area about 2 miles long on a magnetic heading of about 308°, about 15 miles east of the March VOR and about 17 miles southeast of where the target disappeared from radar. The airplane broke up in flight during the hours of darkness and crashed at latitude 33° 14' N, longitude 83° 20' W. The pilot and his three nonpassenger passengers were killed. The airplane wreckage was located in a wooded swamp in 1 to 2 feet of water.

Accidents in the vicinity had been few, and there was no indication of weather conditions as Flight 354 took off from the airport. Weather conditions were light winds, light rain, and low clouds, with a ceiling reported at 0142 for Mدو, 15 nautical miles west of the incident site, indicating an overcast
ceiling at 3,300 feet and a visibility of 10 miles. At 0240 rain began at the airport, and at 0248 the ceiling decreased to 2,000 feet and visibility in light rain and fog. Surface weather observations at 0155 for Warner Robins Air Force Base, Georgia, indicated a ceiling of 6,000 feet overcast and a visibility of 12 miles. At 0240, the visibility decreased to 7 miles in light rain while the ceiling remained unchanged.

National Weather Service (NWS) information from Athens and Macon indicated that at 0140 and 0235 weak radar echoes indicating light rain were observed within a 30-nautical-mile radius of Macon. The radar echoes were reported uniformly at 17,000 feet at 0230 and 18,000 feet at 0245. NWS had forecast light to occasionally moderate mix of rain above the freezing level of 6,000 feet up to 15,000 feet for the time and area of this accident.

Winds between 15,000 feet and 19,000 feet were from the southwest at between 50 and 55 knots. Below 15,000 feet the visibility gradually decreased and the wind direction shifted to southerly around 9,000 feet to southeasterly at 5,000 feet to northeastern at the surface.

Transmerging Logan Air Flight 2457, a Lockheed Hercules L-382, departed Warner Robins Air Force Base for Dover, Delaware at 0225. According to the captain, icing did not occur during the climb to 29,000 feet. He reported light to moderate turbulence below 10,000 feet but no turbulence above this altitude. The captain also observed an overcast layer of clouds near 19,000 feet. Winds during the climb were west-southwesterly at 70 knots.

A Swearingen airplane, N3094T, was in the area of Macon at about 0300. The pilot stated that, while descending from 22,000 to 11,000 feet, he encountered light icing and rain but no turbulence. In addition, the pilot stated that the airplane was in clouds from 19,000 feet to 11,000 feet, and that the rate of ice accumulation was almost negligible on the leading edges of the wings.

1.5

Pieces of the airplane were scattered over a 3-mile area along a bearing of about 305°. (See Figure 1.) The ground terrain was relatively level and consisted of spruce, firs, and swamps. The fuselage section was the largest item recovered along the wreckage path and was found at the greatest distance from where the target disappeared from radar in a wooded area where the water was about 1 to 2 feet deep.

The fuselage came to rest on its left side and was broken into three sections, all of which remained interconnected by loose cables, cabin interior, fuselage, and broken structure. The upper fuselage assembly between fuselage station 551 (6510) and 6859, which contained the forward attachment fittings for the wings, was separated from the fuselage and was recovered scattered along the path. (See Figure 2.) The left forward wing attachment fitting was partially attached to the frame and was bent to the left. The right forward wing attachment fitting was broken off and removed from the wing center section.

All three landing gear assemblies were found within the fuselage wreckage. The landing gear framework for the main gear was in a position that corresponded to the gear-retracted position. The nose gear assembly was also in a retracted position.

The right wing was separated at its root (810) 1940 feet behind of the fuselage, and was recovered relatively intact with the right engine and propeller assembly attached. The right tip tank had separated from the wing.
Figure 1—Wreckage distribution chart.
The right wing upper surface had several chordwise compression buckles along the leading edge. The surface contained several spanwise tension buckles just aft of the leading edge. The upper skin along the separation line at WS 1950 was pulled from rivets at the forward area and was sheared off at the rear area. The structure in this area was bent upward. The fracture surfaces appeared typical of overload.

The wing center section was recovered in one piece. The leading edge along the right side was wrinkled and pulled away from the attachment hinge along the top. The wing spar on the right side was bent upward in the area where the outer right wing panel had separated.

The right forward wing-to-fuselage attachment assembly was torn away from the fuselage frame and remained with the wing center section. The left forward wing-to-fuselage attachment assembly was separated toward the right at the bolt hole on the wing center section. The rear wing-to-fuselage attachment assembly had separated from the wing attachment rivets on the right side and were broken at the clevis holes on the left side. The split fractures at WS 1950 appeared typical of overload. The chordwise rivet attachment lines for the wing skin at WS 1950 had failed due to tension on both the top and bottom wing surfaces.

The outboard panel of the left wing was recovered relatively intact, except that the left tip tank and engine had separated. The upper skin at WS 1950, which had been sheared from the attachment rivets of the wing center section, was bent in a downward direction. The upper skin was buckled in a spanwise direction aft of the engine area and near the outboard leading edge. The leading surface of the wing exhibited spanwise buckling along the leading edge. The inboard engine mount for the left engine had separated from the wing together with a section of wing frame and was recovered attached to the left engine. The firewall area where the inboard mount had separated was pulled forward and inboard. The outboard mount was still attached to the wing; however, the attachment area of the firewall was pulled forward and inboard. The outboard isolator bolt that attaches the engine to the outboard mount was recovered with the engine. The bolt had failed due to bending overload in a direction corresponding to the engine mount's collapsing downward and inboard.

The leading edge of the left wing outboard of the nacelle contained a 18-inch-wide gash that extended back to the forward spar. The wing skin at the upper inboard side of the gash was crumpled downward and smeared with black paint. A piece of sheet metal 4 inches wide by 2 inches long was recovered about 0.7 nautical miles back along the wreckage path from the left wing; it appeared to be from the gash out in the wing.

The empennage section had separated from the fuselage at the upper and lower horizontal attachment fittings at FS 8895. All four attachment fittings remained with the empennage. The upper right attachment fitting contained a 5-inch section of fuselage frame which was bent to the right. The circumferential stiffener at FS 8895 was crumpled aft at the top.

The vertical stabilizer was still attached to the empennage, with the top 18 inches separated from the remainder. The skin was bent toward the left along the upper vertical fin where the R had separated. The remaining section of vertical fin was relatively undamaged.

The rudder was recovered in one piece except for the top area, which was torn off at the upper hinge. The leading edge of the rudder was crumpled and torn back to the front spar. The right side of the rudder was crumpled. The right rudder stop on the empennage was bent forward; the left rudder stop was straight.
The right horizontal stabilizer and elevator were still attached to the empennage. The trim actuator was intact within the stabilizer, with the rod end still attached to the right elevator.

The right elevator was partially attached to the right stabilizer by the outboard hinges and by the trim actuator assembly. The elevator was buckled on the upper surface about 8 inches inboard of the outboard hinges.

The left horizontal stabilizer was separated from the empennage. The failed inboard ends of the forward and aft spars were bent downward. The fractures appeared typical of those caused by bending overload failures.

The left elevator was separated from the stabilizer at the inboard and outboard hinge brackets. Both brackets were pulled from the stabilizer and remained with the elevator piece.

The right engine remained mounted on the right wing with the propeller still mounted. The engine exhibited impact damage and distortion on the lower right side. One of the propeller blades was embedded vertically into the ground. The other three were bent slightly aft but exhibited no other damage. The left engine had separated from the left wing. Its power section was found against the base of a tree about 310 yards from the wreckage path. The left engine cowling was recovered nearly a mile farther back along the wreckage path. The housing for the output reduction gear, the reduction gear assembly, the propeller shaft, and propeller were recovered about another 300 yards farther along the wreckage path, between the power section and the left wing. One propeller blade was embedded in the ground and bent into an “S” shape. The other three blades were bent slightly forward, with no other damage. Attach bolts for the reduction gear housing had been pulled out of the main gearbox and remained with the reduction gear housing. The thread inserts were pulled from the main gearbox and remained on the ends of the mounting bolts with the reduction gear box.

Both engines were disassembled and examined under supervision of a Safety Board Investigator. Compressor impeller and compressor impeller blades of the left engine showed circumferential rub. Blades on the second- and third-stage turbine wheels had been rubbed and were bent opposite the direction of rotation. Very light rub marks appeared on the third-stage turbine wheel blades of the right engine. The compressor impeller shovels contained impact gouge marks that matched the impeller blades.

This airplane has five fuel tanks: two wingtip tanks, an outboard tank in each wing and a main tank in the center wing. Fuel from the outer tanks flows to the engines through the main tank. Valves of the left and right wingtip fuel tanks were found in the closed position. Both left and right main fuel shut-off valves from the center tank to the engines were found in the open position. The McCauley Director of Operations stated that, based on fuel consumption records for this itinerary, fuel from the tip tank normally was exhausted near Jacksonville. Flight 354 normally departed Jacksonville with fuel from the outer wing tanks. This fuel was typically depleted in the vicinity of Nacog and the flight continued on fuel from the main tank.

Because of the extensive breakup of the airplane, the electrical and avionics systems and flight instruments were all severely damaged. Little or no information could be gained from their examination.
1.2 Medical and Pathological Information

Postmortem and toxicological examination of the pilot disclosed no evidence of factors that would have affected his ability to operate the airplane. The cause of his death was severe trauma from impact. His first-class medical certificate required that the pilot wear corrective lenses for near and distant vision. A pair of bifocal glasses was found in the wreckage. Postmortem examination of the passengers disclosed that all had died as a result of multiple traumas.

1.3 Pilot Information

The pilot held Airline Transport Pilot Certificate No. 432968872 with airplane multi-engine and single engine land ratings and commercial privileges. His certificate was issued February 16, 1982. He also held a flight instructor's certificate issued the same date, and an airframe and powerplant mechanic's certificate issued April 24, 1985. His most recent check was a 14 CFR Part 121 competency and proficiency check, which was satisfactorily completed on February 17, 1983. His last recurrent training in the MU-2 was completed December 21, 1983. The pilot had accumulated about 3,767 flight-hours, 567 of which were in the MU-2B-60.

He had flown 106 hours in the previous 90 days, 48 hours in the previous 30 days. He had been off duty for 12 hours prior to reporting for this flight. It could not be determined how the off-duty time had been spent. He had been on duty for 8 hours at the time of the accident and had flown 5.6 hours in the previous 24 hours. He had been flying this schedule regularly for at least 5 months prior to the accident.

1.4 Weight and Balance

The aircraft was refueled with 292 gallons of jet-A fuel at Memphis for a total fuel load of 404 gallons (2,723 lbs). A review of documents concerning previous flights on the same schedule indicated that the airplane, upon reaching Jacksonville, Florida, would have depleted the fuel from the tip tanks, leaving fuel only in the main and outer tanks. The approximate 65-minute flight from Jacksonville to the accident area would have consumed about 59.0 lbs of fuel, resulting in an airplane weight of about 9,736 lbs at the time of the accident. Maximum allowable gross takeoff weight was 11,075 lbs.

A copy of the cargo manifest recovered from the wreckage indicated a cargo weight of 728 lbs on board when the airplane departed Jacksonville. This weight and the previously described estimated weight of fuel remaining were used in the following weight and balance computations.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>WEIGHT</th>
<th>MOMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty weight</td>
<td>7,689</td>
<td>1,551,443</td>
</tr>
<tr>
<td>Pilot</td>
<td>240</td>
<td>39,336</td>
</tr>
<tr>
<td>Copilot/Passenger</td>
<td>180</td>
<td>4,570</td>
</tr>
<tr>
<td>Passenger</td>
<td>35</td>
<td>7,706</td>
</tr>
<tr>
<td>Passenger</td>
<td>55</td>
<td>7,706</td>
</tr>
<tr>
<td>Payload (728 lbs)</td>
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<td>54,000</td>
</tr>
<tr>
<td></td>
<td>240</td>
<td>54,000</td>
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<tr>
<td></td>
<td>240</td>
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<tr>
<td>Fuel-Main Tanks</td>
<td>1,032</td>
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<tr>
<td>Fuel-Outer Tanks</td>
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<td>51,002</td>
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<tr>
<td>Baggage</td>
<td>10</td>
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<td></td>
<td></td>
<td>10,329 lbs</td>
</tr>
<tr>
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<td>2,063,008</td>
</tr>
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</table>

Center of gravity location = moment - weight
Center of gravity (c.g.) 190.70 inches (c.g. limits are 189.9 to 199.4 inches).
2. ANALYZE

The location of the loss of the radar target relative to the location of the wreckage indicated a course reversal. The unusual engine noises described by witnesses, and the course reversal, indicated that the airplane departed from normal cruise flight. Based on available evidence, however, the Safety Board concluded no reason for the airplane's departure from level cruise flight or its course reversal. The extensive wreckage scatter indicated that the airplane broke up structurally during an attempt to recover control. Although light rain was beginning at the time of the accident, analysis of NWS data and reports of two pilots who passed through the area indicated there was no significant turbulence and probably little icing at higher altitudes. Postmortem examination of the pilot disclosed no evidence of incapacitation or inability to function. The airplane's weight and center of gravity were within the proper limits and were not factors in the accident.

The airplane broke up and crashed in an area it had already passed over—10 miles back along its flight path from the last location indicated on the controller's radar screen. Therefore, the loss of the radar indication was not a result of the breakup but may have indicated some difficulty which initiated a departure from altitude and lead to the breakup.

The widespread distribution of the wreckage indicates that the airplane broke up while in flight. The relatively small scatter pattern of the heaviest pieces of wreckage—fuselage, outer wings, center wing, and engines—indicates that there was not a long descent after breakup. If the airplane had broken up at high altitudes, the components would probably have been more widely separated. The lighter pieces of wreckage, most affected by winds, were the farthest away from the main wreckage and to the northwest of it. A meteorological analysis of the winds revealed that at the cruising altitude 18,000 feet, they were southerly at 65 knots, at 3,000 to 6,000 feet, they were from the southeast at about 30 knots, and below 3,000 feet they were easterly with velocities of 4 to 6 knots at the surface. Because the wreckage was scattered along a southeast to northwest line, it can be concluded that the airplane broke up 6,000 feet or below. The lighter fragments, subject to the influence of wind, were scattered away from the heaviest piece, the fuselage, in a northwest direction. If the breakup had occurred above 6,000 feet, the higher velocity southerly and southwesterly winds would have produced a more widespread, less directional scatter pattern.

All of the major fractures were determined to have been caused by overload stresses, which exceeded the design strength of the structure. The fractures observed at the wing and empennage separations indicate the right wing failed in an upward direction and the left wing and left horizontal stabilizer failed in a downward direction. This pattern of structural breakup indicates that the right wing failed in positive aerodynamic overload followed by failures of the left wing and stabilizer in a negative direction from inertia and air loads induced by the rapid roll that resulted from the loss of the right wing. Therefore, the Safety Board concludes that the in-flight structural breakup of the airplane was the result of extreme airplane noseup elevator input at high airspeed, most likely caused by an attempt to recover from an unwanted high speed descent or unusual altitude.

Because of the extensive damage to the electrical system no positive evidence could be found to confirm that electrical power was available when the airplane broke up. A loss of electrical power could have resulted in autopilot disengagement and partial loss of lighting and flight instruments and loss of transponder signal. Such a situation in clouds at night could easily have led to a departure from level flight. While it cannot be dismissed as a possibility, no positive conclusion can be made that a loss of electrical power occurred and was the reason for the departure from normal flight.
A loss of power from an engine could also have led to a yaw and possibly a loss of control. However, the damage in the engine appears to have been from the breakup and subsequent ground impact. There was no internal damage in the housing of the left main gear box or the output reduction gear which indicates that the reduction gear did not undergo massive internal failure. The damage pattern of the bolt holes on the main gear box housing suggests that the reduction gear housing and propeller separated from the left engine in an outward and upward direction, while the failure of the engine mount structure indicates the engine separated in an inward and downward direction. The direction of separation of the propeller and gear box was most probably caused by high gyroscopic loads induced by the roll that followed separation of the right wing.

Although there is some evidence that the propeller may have struck the left wing leading edge, the Safety Board could not determine where in the breakup sequence that contact was made. However, the mating skin from the propeller sits in the leading edge were found within the wreckage path, indicating that the propeller may have struck the wing during the breakup and that the gear box and propeller were still intact on the engine when the rear target disappeared from the radar screen northwest of the crash site.

1.1) Human Factors

In addition to possible airworthiness reasons for this accident, the Safety Board considered possible human factors which could have led to the loss of control and subsequent airframe breakup. One possibility considered is that the passengers, particularly the young children, might have become sick, restless, or otherwise caused distraction to the pilot sufficient to initiate the loss of control. However, there is no evidence to conclude that this occurred.

The Safety Board also considered the possibility that the pilot fell asleep, along with his passengers, and the airplane deviated from controlled flight. Research into the human circadian rhythm (biological clock) shows that the biological functions decrease and human performance, including vigilance and reaction time, is degraded during the early morning hours. This is true even when the human is "adapted" to the nighttime work schedule, as had this particular pilot. However, the pilot did make a radio call to Jacksonville ARTCC about 5 minutes before the apparent time of the "odd" event of the accident scenario. Therefore, the possibility that he fell asleep in that short time is unlikely. However, the lowered awareness state because of possible fatigue and circadian desynchronosis would have precluded the pilot from being as vigilant and reactive to abnormal situations or turbulence or an otherwise minor mechanical problem.

The pilot's total and recent flight experience are not considered a factor in this case. His wife was not a pilot and consequently could not assist the pilot in his flying duties. Nor would it be likely that she could have controlled the airplane in the unlikely event that he was incapacitated. The autopsy findings rule out the possibility that the pilot was incapacitated and therefore this is not considered a possible cause of the accident.

In summary, no airworthiness reasons for this accident could be established nor could airworthiness reasons be ruled out. Similarly, human factors could not be ruled out as causal or contributory, although the probability of reduced pilot performance existed and would have contributed to the pilot's failure to bock with airworthiness or other problems if not addressed and would have allowed the flight to continue.

The Mitsubishi MU-2 with turboprop airplane has been involved in a series of fatal accidents in the past several years. The circumstances of several accidents suggested
that some of the causal factors might be design-related or design-induced. Some involved engine failure or loss of power. Several others were unexplained descent into the ground from cruise similar to this accident.

3. CONCLUSIONS

3.1 Findings

1. The airplane broke up at an altitude between 3,000 feet and 6,000 feet.
2. All the initial fractures of the right wing were determined to be the result of overload.
3. The initial structural failure of the right wing was caused by aerodynamic overload under positive loading.
4. Turbulence and icing at the airplane's cruise altitude were light.
5. The airplane's weight and center of gravity were within the limits and were not factors in this accident.
6. Evidence relating to a loss of electrical power was inconclusive.
7. Pilot distraction from passengers, or fatigue, may have slowed his performance and reduced his reaction time to cope with an airplane problem.
8. The reason for the departure from normal flight could not be determined.

3.3 Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the uncontrolled descent of the airplane for undetermined reasons, and the overstress and breakup of the airplane structure during an attempted recovery by the pilot.

4. RECOMMENDATIONS

This accident was another in a series of accidents involving the Mitsubishi MU-2 over the past several years in which the airplane made an uncontrolled descent for unexplained reasons. Because of these and other MU-2 accidents, on August 24, 1983, the Safety Board issued the following Safety Recommendation to the Federal Aviation Administration:

Conduct a special certification review of Mitsubishi MU-2 airplanes relative to the engines, fuel system, autopilot, and flight control systems; flight in known icing conditions; engine inoperative characteristics; and handling characteristics during IFR landing approaches; and take the appropriate action to correct any deficiencies identified.

The FAA Special Certification Review Team began their evaluation on October 24, 1983. All flight evaluations had been completed by February 1984. The FAA has projected a project completion date of April 30, 1984. Pending receipt of the findings of this team, the Safety Board has classified the status of this recommendation as "Open—Acceptable Action."
BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JIM BURNETT
Chairman

/s/ PATRICIA A. GOLDMAN
Vice Chairman

/s/ D.H. PATRICK BURREY
Member

/s/ DONALD D. ENORB
Member

/s/ VERNON L. GROEB
Member

February 11, 1984
APPENDIX A

INVESTIGATION AND FINDINGS

The Safety Board was notified of the accident about 0530 on March 24, 1983, and a team of six investigators was dispatched to the scene immediately. Investigative groups were established for the investigation in the areas of operations, wreckage, structures, systems, and powerplant and were not actually separate entities. Investigations focused on:

- Parts to the investigation included the Federal Aviation Administration, Mitsubishi Aircraft International, McCauley Aviation, Inc., Garrett Turbine Engine Company, and Hamilton Propeller Company.

Hearing

No public hearing was held.
Joe Michael Holland, 28, held Airline Transport Pilot Certificate 433068618. He held a Flight Instructor Certificate with airplane, single engine land, multi-engine land, and instrument ratings. His first class medical certificate was issued January 14, 1983 with a limitation requiring glasses for near and distant vision.

His initial Mitsubishi MU-2B training, both flight and simulator, was completed at Flight Safety International, Inc., Houston, Texas in July 1982. He completed a MU-2 pilot refresher course there on December 8, 1982. He had 1,647 total flight hours with 647 hours in MU-2B-60 airplanes.
APPENDIX C

AIRPLANE INFORMATION

Mitsubishi MU-2B-6, serial No. 7855A; N72B, was issued a Certificate of Airworthiness on December 21, 1976. It was owned by Mitsubishi Aircraft International, San Angelo, Texas, and leased to McCawley Aviation. It had flown a total of 1,716.3 hours. The last inspection was on March 26, 1999, and the airplane had flown 2.1 hours since the inspection.

The engines were Garrett TPE 331-1B-591M, installed on February 21, 1982.

<table>
<thead>
<tr>
<th>Left Engine</th>
<th>Right Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial No.</td>
<td>P-36257</td>
</tr>
</tbody>
</table>

| Total Time Since New | 261.3 hrs. | 287.3 hrs. |
| Time at Installation | 276.1 hrs. | 294.2 hrs. |
| Time Since Installation | 75.1 hrs. | 75.1 hrs. |

The propellers were Hartzell HC-841N-6DL/LT702-2XB - 6/8, installed on February 27, 1963 at zero time since overhaul. The left propeller was serial No. CD-840, the right propeller was serial No. CD-841. They had flown 75.1 hours since overhaul and installation.