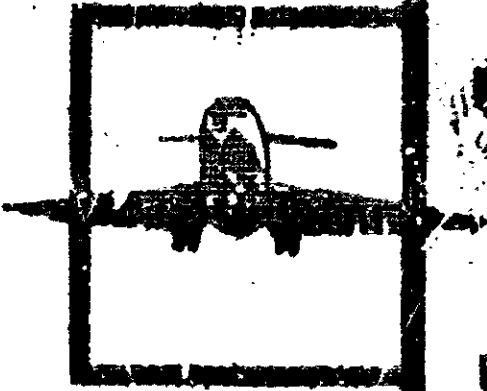
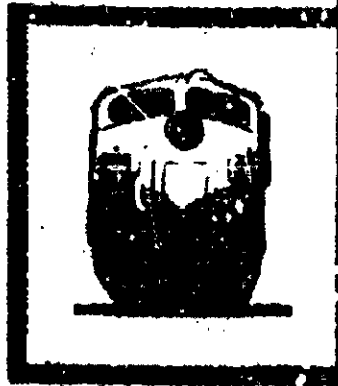




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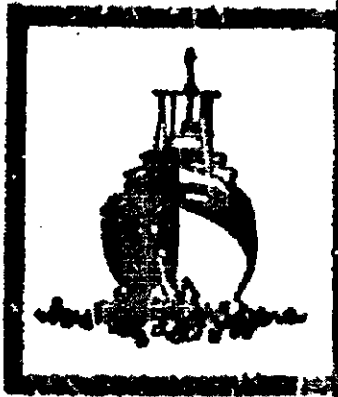


NATIONAL TRANSPORTATION SAFETY BOARD

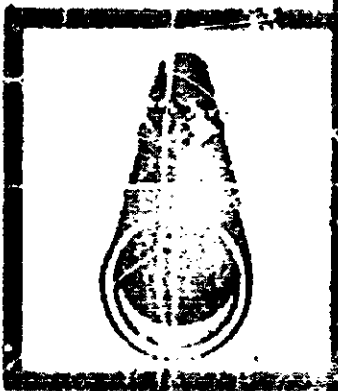


WASHINGTON, D.C. 20584

AIRCRAFT ACCIDENT REPORT



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



NTSB/AAR-84/01



UNITED STATES GOVERNMENT

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SPRINGFIELD, VA 22161

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16. Abstract At 0228 eastern standard time on March 24, 1983, McCauley Flight 354, a Mitsubishi MU-2B, N72B, 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 5 miles. The clouds 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 overstress and breakup of the airplane structure during an attempted recovery by the pilot.					
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CONTENTS

SYNOPSIS

1. FACTUAL INFORMATION

1.1 History of the Flight

1.2 Meteorological Information

1.3 Wreckage

1.4 Medical and Pathological Information

1.5 Pilot Information

1.6 Weight and Balance

2. ANALYSIS

2.1 Human Factors

3. CONCLUSIONS

3.1 Findings

3.2 Probable Cause

4. RECOMMENDATIONS

APPENDICES

Appendix A—Investigation and Hearing

Appendix B—Personnel Information

Appendix C—Airplane Information

1. The following information was obtained from the investigation of the accident on 11/11/61. The flight was a scheduled flight from New York to Los Angeles. The aircraft was a Boeing 707-120, registration N70712, operated by Eastern Airlines. The flight was piloted by Captain [Name] and First Officer [Name]. The aircraft was en route to Los Angeles when it encountered a severe thunderstorm over the Gulf of Mexico. The aircraft was struck by lightning, which caused a loss of control. The aircraft crashed into the ocean, approximately 100 miles south of New Orleans. All 100 passengers and crew members were killed. The investigation is ongoing, and the probable cause has not yet been determined. Recommendations will be issued upon completion of the investigation.

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20581

AIRCRAFT ACCIDENT REPORT

Adopted: February 21, 1984

McCAULEY AVIATION, INC.

NEAR JEFFERSONVILLE, GEORGIA

MARCH 24, 1983

800-123-456

At 0236 eastern standard time on March 24, 1983, McCauley Flight 354, a Mitsubishi MU-2B, N72B, 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 Jacksonville, 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 5 miles. The clouds extended to above 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 breakup of the airplane structure during an attempted recovery by the pilot.

1. FACTUAL INFORMATION

1.1 History of the Flight

The flight was the return leg to Memphis of a regularly scheduled, nighttime, four-leg round trip between Memphis, Atlanta, and Jacksonville. Its purpose was to transport cancelled 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 6 and 4, with the permission of company management.

The flight operated Monday through Friday on the following schedule:

Flight No.	Departure	From	To	Arrival
352	2145 est 1/	Memphis	Atlanta	0115 est
353	0045 est	Atlanta	Jack.ville	0630 est
354	0215 est	Jack.ville	Atlanta	0620 est
355	0845 est	Atlanta	Memphis	0910 est

1/ The Mitsubishi MU-2B-00 is a twin engine, high wing, low speed airplane with a normal seating capacity of up to six passengers and two pilots. A major feature of this airplane is the use of spoilers instead of conventional ailerons for lateral control.

2/ All times herein are eastern standard time based on the 24-hour clock, unless otherwise indicated as central standard time (cst).

On March 23, 1983, the pilot and passengers flew from Pine Bluff, Arkansas, to Memphis, Tennessee, in another airplane operating as McCauley Flight 354. While en route from Pine Bluff, the pilot received a weather briefing at 2140 by radio from the Little Rock, Arkansas, Flight Service Station (FSS). The briefing included the current weather for Memphis, Atlanta, and Jacksonville, and the terminal forecast for Atlanta.

N72B departed Memphis on schedule as McCauley Flight 354, with a full fuel load of 404 gallons of Jet A turbine fuel. The usual McCauley 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. N72B departed Jacksonville at 0202 on an instrument flight rules (IFR) flight plan as McCauley Flight 354 with 126 pounds of cargo and an estimated 826 gallons of fuel on board.

According to the agent who transferred the cargo at Jacksonville, the pilot appeared to be alert, in good spirits and acted normally. The pilot's wife and children departed during the stop and when they boarded the children occupied the two passenger seats and the pilot's wife occupied the right front seat.

Jacksonville Air Route Traffic Control Center (ARTCC) cleared McCauley Flight 354 to cruise at flight level (FL) 200 to Atlanta via airway J-45. The magnetic course of J-45 is 320°. At about 0208, the pilot of Flight 354 requested and received controller approval to remain at flight level 180; also at the pilot's request, the controller then cleared Flight 354 direct to Atlanta. At 0224:57, a radar handoff of Flight 354 was accomplished between traffic controllers of the Jacksonville and Atlanta Centers. At 0225:20, Flight 354 contacted the Atlanta ARTCC controller and reported at flight level 180; this was Flight 354's last transmission. During the early morning hours when traffic volume is low, Atlanta Center operates using a backup computer while the primary computer is out of service for normal scheduled maintenance. The backup computer has 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 target VOR on a northeasterly course. According to the controller, the target disappeared from the radar screen about 11 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 Jacksonville, Georgia, reported hearing sounds of an airplane engine alternately at high speeds, then diminishing. Some reported it as a loud, high-pitched whine that suddenly stopped; it was followed by crashing sounds. The airplane wreckage later was found scattered over a field about 2 miles long on a magnetic heading of about 305°, about 15 miles east of the 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 32° 28' N, longitude 83° 25' W. The pilot and his three nonrevenue passengers were killed. The fuselage section was located in a wooded swamp in 1 to 2 feet of water.

1.3 ~~Weather conditions~~ ~~at the time of the accident~~ ~~on March 23, 1983~~ ~~at 0202~~ ~~for Mission~~ ~~15 nautical miles west of the accident site~~ ~~indicated an overcast~~

Weather conditions at the time of the accident were light rain, and the weather was overcast at 0202 for Mission, 15 nautical miles west of the accident site, indicated an overcast

ceiling at 3,200 feet and a visibility of 10 miles. At 0240 rain began at the airport, and at 0248 the ceiling decreased to 2,000 feet broken with 5 miles visibility in light rain and fog. Surface weather observations at 0155 for Warner Robins Air Force Base, Georgia, 12 nautical miles west of the site, indicated a ceiling of 5,000 feet overcast and a visibility of 12 miles. At 0245, 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 0230 and 0255 weak radar echoes indicating light rain were observed within a 20-nautical-mile radius of Macon. The radar tops were reported uniform at 17,000 feet at 0230 and uniform at 20,000 feet at 0255. NWS had forecast light to occasionally moderate mixed icing above the freezing level of 5,000 feet up to 18,000 feet for the time and area of the accident.

Winds between 15,000 feet and 19,000 feet were from the southwest at between 50 and 35 knots. Below 15,000 feet the velocities gradually decreased and the wind direction shifted to southerly around 8,000 feet to southeasterly at 5,000 feet to northeasterly at the surface.

Transamerica Logair 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 that altitude. The captain also observed an overcast layer of clouds near 10,000 feet. Winds during the climb were west-southwesterly at 75 knots.

A Swearingen airplane, N3094T, was in the area of Macon at about 0230. The pilot stated that, while descending from 22,000 to 11,000 feet, he encountered light rime icing and snow but no turbulence. In addition, the pilot stated that the airplane was in clouds from 12,000 feet to 11,000 feet and that the rate of ice accumulation was almost negligible on the leading edges of the wings.

1.2 ~~Wreckage~~

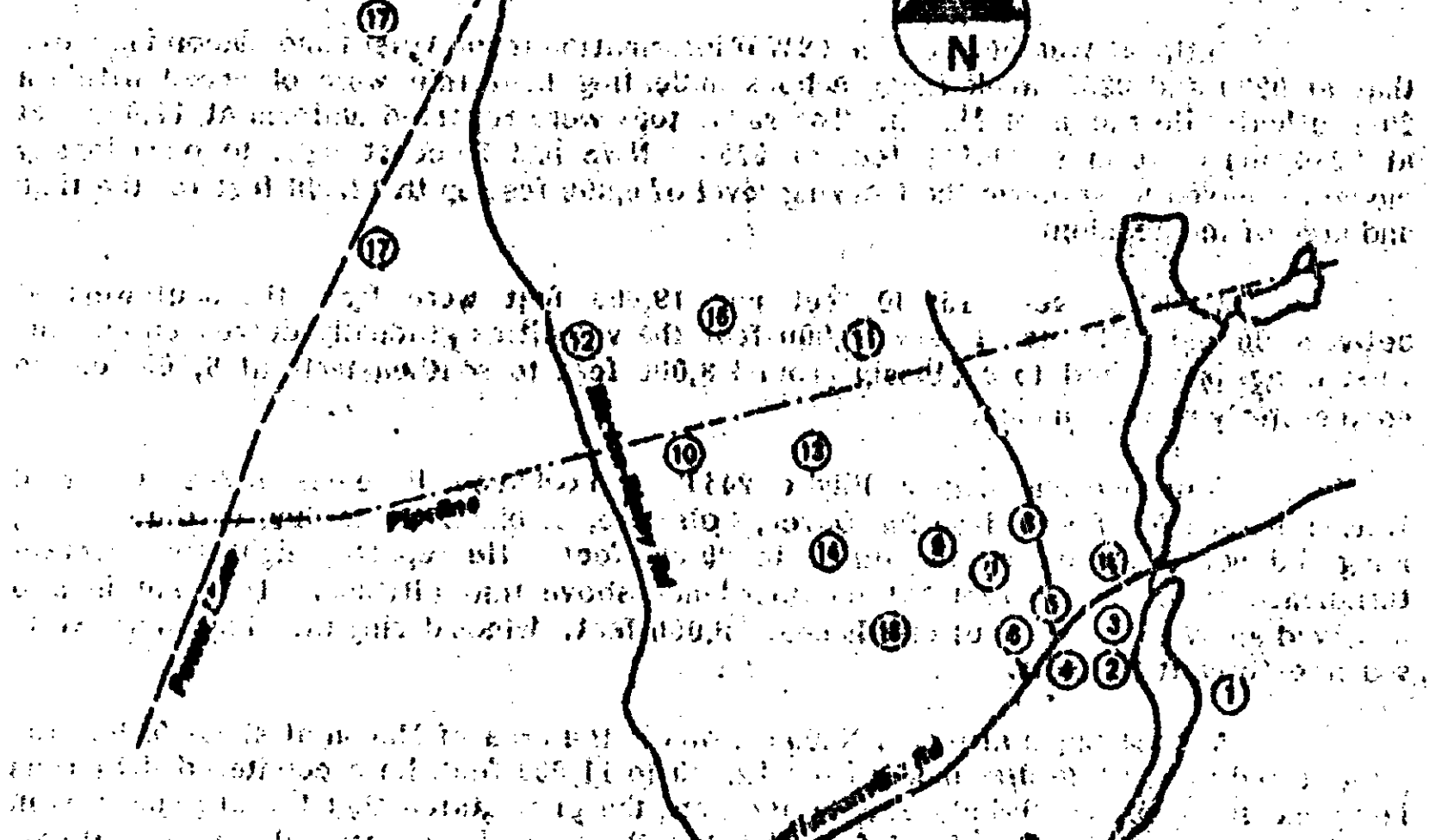
Pieces of the airplane were scattered over a 7-mile area along a bearing of about 305°. (See figure 1.) The ground terrain was relatively level and consisted of forest, fields, and swamps. The fuselage section was the largest item recovered along the wreckage path and was found at the greatest distance from where the target disappeared from radar in a wooded swamp 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, furnishings, and broken structure. The upper fuselage assembly between fuselage stations (FS) 4810 and 4859, 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 remained with the wing center section.

All three landing gear assemblies were found within the fuselage wreckage. The landing gear jackscrew 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 FS station (FS) 1910 just inboard of the nacelle, and was recovered relatively intact with the right engine and propeller assembly attached. The right tip tank had separated from the wing.

The diagram shows the wreckage distribution chart for the aircraft. The chart is a map of the area around the crash site, showing the location of the wreckage and the distribution of the wreckage. The chart is divided into 18 numbered areas, each representing a different part of the aircraft. The areas are numbered 1 through 18, and the locations are marked with numbers 1 through 18. The chart is a map of the area around the crash site, showing the location of the wreckage and the distribution of the wreckage. The chart is divided into 18 numbered areas, each representing a different part of the aircraft. The areas are numbered 1 through 18, and the locations are marked with numbers 1 through 18.



Legend:

- 1. Fuselage
- 2. Left Engine
- 3. Wing Center Section
- 4. Fuselage/Wing Attachment Fitting
- 5. Left Wing Tank
- 6. Right Wing and Engine
- 7. Right Wing Tank
- 8. Left Wing
- 9. Spoiler & Flap Filler
- 10. LH Landing Gear Door
- 11. Right Flap
- 12. Right Vane
- 13. Engine Cover Top LH
- 14. Flap
- 15. Left Horizontal Stub
- 16. Fuselage Left Door
- 17. Metal Filler from Tail
- 18. Left Propeller & Gear Box

Figure 1. - Wreckage distribution chart.

1. The following information was obtained from the records of the Department of the Interior, Bureau of Land Management, regarding the land owned by the United States in the State of California:

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110-23-49

Figure 1. Airplane Wing and Fuelage Station Diagram.

Figure 2. Airplane Wing and Fuselage Station Diagram.

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 assemblies had separated from the spar attachment rivets on the right side and were broken at the clevis holes on the left side. The spar 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 lower 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 crushed downward and smeared with black paint. A piece of sheet metal 8 inches wide by 2 inches long was recovered about 0.7 nautical mile back along the wreckage path from the left wing; it appeared to be from the gash cut in the wing.

The empennage section had separated from the fuselage at the upper and lower hyeron attachment fittings at PS 8895. All four attachment fittings remained with the empennage. The upper right attachment fitting contained a 3-inch section of fuselage frame which was bent to the right. The circumferential stiffener at PS 8895 was crushed 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 stabilizer 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 crushed and torn back to the front spar. The right side of the rudder was crushed. 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 hinge and by the trim actuator assembly. The elevator was buckled on the upper surface about 8 inches inboard of the outboard hinge.

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 pieces.

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 fuselage. 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 "8" 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 gearbox.

Both engines were disassembled and examined under supervision of a Safety Board Investigator. Compressor shrouds 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 shrouds 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 shutoff 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 using fuel from the outer wing tanks. This fuel was typically depleted in the vicinity of Macon 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.

1.4 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 trauma.

1.5 Pilot Information

The pilot held Airline Transport Pilot Certificate No. 432066872 with airplane multi-engine and single engine land ratings and commercial privileges. His certificate was issued February 18, 1982. He also held a flight instructor's certificate issued the same date, and an airframe and powerplant mechanic's certificate issued April 29, 1983. His most recent check was a 14 CFR Part 135 competency and proficiency check, which was satisfactorily completed on February 17, 1983. His last recurrent training in the MU-2 was completed December 21, 1982. The pilot had accumulated about 3,747 flight-hours, 547 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 5.0 hours in the previous 24 hours. He had been flying this schedule regularly for at least 5 months prior to the accident.

1.6 Weight and Balance

The aircraft was refueled with 292 gallons of Jet-A fuel at Memphis for a total fuel load of 404 gallons (2,728 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 45-minute flight from Jacksonville to the accident area would have consumed about 59 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 11,575 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.

<u>ITEM</u>	<u>WEIGHT</u>	<u>MOMENT</u>
Empty weight	7,589	1,551,442
Pilot	240	23,128
Copilot/Passenger	180	17,436
Passenger	35	4,170
Passenger	55	7,700
Payload (728 lbs)	240	41,200
	240	54,100
	248	63,280
Fuel-Main Tanks	1,032	211,504
Fuel-Outer Tanks	462	51,922
Baggage	10	2,937
	10,529 lbs	2,558,808

Center of gravity location = moment ÷ weight

Center of gravity (c.g.) 196.78 inches (c.g. limits are 190.9 to 199.4 inches).

2. ANALYSIS

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 could establish 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 surface at the time of the accident, analysis of NWS data and reports of two pilots who passed through the same area indicated there was no significant turbulence and probably little icing at the 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 track 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 lightest 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 southwesterly at 55 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, most subject to the influence of wind, were scattered away from the heaviest piece, the fuselage, in a northwest direction. If the break up 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 attitude.

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 engines appears to have been from the breakup and subsequent ground impact. There was no internal damage in the housing of the left main gearbox 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 gearbox housing suggests that the reduction gear housing and propeller separated from the left engine in an outboard and upward direction, while the failure of the engine mount structure indicates the engine separated in an inboard and downward direction. The direction of separation of the propeller and gearbox 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 cuts 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 gearbox and propeller were still intact on the engine when the radar target disappeared from the radar screen northwest of the crash site.

2.1 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 a 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 has "adapted" to the nighttime work schedule, as had this particular pilot. However, the pilot did make a radio call to Jacksonville ARTCC about 8 minutes before the apparent time of the onset 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 desynchronization would have precluded the pilot from being as vigilant and reactive to abnormal situations such as 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 of 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 cope with airworthiness or other problems or distractions, and would have slowed his reaction time and vigilance to maintain safe flight.

The Mitsubishi MU-2 twin 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 descents into the ground from cruise similar to this accident.

3. CONCLUSIONS

3.1 Findings

1. The airplane broke up at an altitude between 5,000 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 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.

3.2 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 break-up 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 IBC 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/ G.H. PATRICK BURSLEY
Member

/s/ DONALD D. ENOEN
Member

/s/ VERNON L. GROBE
Member

February 11, 1984

APPENDIX A

INVESTIGATION AND FINDINGS

The Safety Board was notified of the accident about 0530 on March 24, 1963, and a team of six investigators was dispatched to the scene immediately. Investigative groups were established for the investigation in the areas of operations, maintenance, structure, systems, and powerplant.

Parties 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.

APPENDIX B

PERSONNEL INFORMATION

Joe Michael Holland, 28, held Airline Transport Pilot Certificate 432066812. He also 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 8,447 total flight hours with 647 hours in MU-2B-60 airplanes.

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dated 1-15-83, signed [illegible]

APPENDIX C

AIRPLANE INFORMATION

Mitsubishi MU-2B-6, serial No. 7855A; N72B, was issued a Certificate of Airworthiness on December 21, 1978. It was owned by Mitsubishi Aircraft International, San Angelo, Texas, and leased to McCauley Aviation. It had flown a total of 1,718.2 hours. The last inspection was on March 28, 1983, and the airplane had flown 2.9 hours since the inspection.

The engine were Garrett TPE 331-16-501M, installed on February 27, 1983.

	Left Engine Serial No. P-38267	Right Engine Serial No. P-38059
Total Time Since New	251.3 hrs.	251.3 hrs.
Time at Installation	276.1 hrs.	276.1 hrs.
Time Since Installation	75.1 hrs.	75.1 hrs.

The propellers were Hartzell HC-B4TN-6DL/LT702-82B - U/A, installed on February 27, 1983 at zero time since overhaul. The left propeller was serial No. CH-259, the right propeller was serial No. CD-843. They had flown 75.1 hours since overhaul and installation.