

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED: February 10, 1965

RELEASED: February 16, 1965

PAN AMERICAN WORLD AIRWAYS
BOEING 707-139, N779PA
JOHN F. KENNEDY INTERNATIONAL AIRPORT
JAMAICA, NEW YORK
APRIL 7, 1964

SYNOPSIS

A Pan American World Airways, Inc., Boeing 707-139, N779PA, operating as Flight 212 from San Juan, Puerto Rico to New York, New York, touched down on the far end of runway 4R at John F. Kennedy International Airport and during landing roll overran the runway and came to rest in Thurston Basin on April 7, 1964, at 2303 e.s.t.

The aircraft sustained major structural damage, there was no fire. Of the one hundred and forty-five occupants including nine crew members thirty-three received minor injuries and seven serious injuries. There were no fatalities.

The Board determines that the probable cause of this accident was the captain's deviation from the glide slope during an ILS approach resulting in a touchdown on the runway at a point and speed which precluded stopping the aircraft on the remaining runway.

Investigation

Pan American World Airways, Inc., Flight 212 (PAA 212) was a regularly scheduled passenger flight from San Juan, Puerto Rico, to John F. Kennedy International Airport (JFK), Jamaica, New York. The flight originated at San Juan but because of adverse weather upon arrival in the New York area, it was diverted to Dulles International Airport, Chantilly, Virginia. With subsequent improvement in the New York weather, the flight departed Dulles International Airport for JFK Airport.

Following an Instrument Landing System (ILS) approach, touchdown was made on runway 4R. The aircraft ran off the far end of the runway and came to rest in Thurston Basin sustaining major structural damage. There were no fatalities among the 145 persons aboard the aircraft. However, 33 received minor and 7 serious injuries.

The crew involved in this accident departed Miami, Florida, in N779PA at 1152 e.s.t.^{1/} April 7, 1964, as the assigned crew of PAA Flight 455, a regularly scheduled passenger flight between Miami and San Juan. This flight was routine and landed at San Juan at 1355.

^{1/} All times herein are eastern standard based on the 24-hour clock.

At San Juan the flight crew received a weather briefing from U.S. Weather Bureau personnel which included the terminal forecasts issued by the U.S. Weather Bureau offices at JFK Airport, Boston, Detroit, and Washington, D. C., for a 24-hour period beginning at 1200. After making other preflight preparations, the same crew departed San Juan in N779PA at 1514 for JFK Airport operating as Pan American World Airways Flight 212 (PAA 212). The flight was conducted in accordance with an Instrument Flight Rules (IFR) clearance and was routine until arrival in the New York area. After descending and entering the holding pattern at the Colts Neck VOR at 1838, PAA 212 received the latest JFK weather which was below landing minimums. Consequently the flight proceeded to its alternate, Dulles International Airport and landed there at 1937.

The flight remained on the ground at Dulles for approximately 2-1/2 hours. During this time the aircraft was serviced, additional weather information was obtained by the crew, and an instrument flight plan was filed to JFK Airport.

The only required maintenance on N779PA at Dulles was the replacement of the No. 1 VOR navigation receiver. No other mechanical discrepancies were noted.

A dispatch release was received by Pan American operations, Dulles Airport at 1938, and in part contained the following information: route to be flown, flight time of 40 minutes, fuel burn off of 12,000 pounds, fuel required 37,000 pounds and a maximum takeoff gross weight of 202,000 pounds.

The company operations representative at Dulles stated. . . "the weight and balance was begun before the remote clearance was received and TOGW (takeoff gross weight) and DTW (dry tank weight) were entered in haste and in error in the limitations block. When the clearance was received I completed the flight plan/clearance and, in doing so, became immediately aware of the error, but because of becoming involved in problems with passenger and baggage removal the correction was not made immediately to the weight and balance . . . hurriedly finished it there in the galley, doing the addition in my head and again forgetting to correct the weight limitations block. I delivered the papers to the cockpit and the flight left."

Examination of the load summary/weight and balance sheet for N779PA from Dulles to Kennedy showed the following:

Fuel stored	21,380 pounds
Fuel required	37,400 pounds
Taxi fuel	2,000 pounds
Fuel at blocks	60,780 pounds
DTW (dry tank weight)	149,502 pounds
TOGW (takeoff gross weight)	208,282 pounds
Weight at blocks	210,282 pounds

Examination of the flight plan and clearance sheet for N779PA from Dulles to Kennedy showed the following:

Time en route	36 minutes
Maximum TOGW	202,000 pounds
Maximum LGW (landing gross wt.)	190,000 pounds
Destination fuel	12,000 pounds
Estimated TOGW	210,000 pounds

A total of 5,117 gallons of fuel was added to N779PA at Dulles as shown by the fueling tickets. The Jet Fuel Loading Instructions sheet for N779PA at Dulles showed the following.

Station fuel - kerosene, density 6.80 lbs/gal	
On aircraft before fueling - 28,000 pounds of JP-4,	
	density 6.42 lbs/gal
Mixed fuel density	6.65 lbs/gal
Total fuel load	9,140 gals
	60,780 pounds

The maximum takeoff gross weight of 202,000 pounds of this particular flight was limited by the aircraft design maximum landing weight of 190,000 at Kennedy Airport and based on a 12,000 pound fuel burn off in flight.

Computations on the weight and balance sheet revealed the center of gravity was within the allowable limits.

PAA 212 departed Dulles Airport at 2221 with the same crew of 9 and 136 passengers. The flight was conducted under instrument conditions and was routine until arrival in the New York area. At 2239 the New York Center controller transmitted the JFK weather to PAA 212. The runway visual range (RVR) on runway 4R at JFK was reported to be 1,600 feet. At 2250 JFK Approach Control established radar and radio contact with PAA 212 and advised: "Depart Colts Neck heading zero nine zero for vectors to the final approach course, Kennedy weather is three hundred thin broken, measured ceiling one thousand five hundred overcast, visibility one and one-half miles fog, and the runway visual range runway four right more than six thousand feet, standby." PAA 212 acknowledged the transmission. N779PA was restricted to landing Minimums of 300-foot ceiling and 3/4 mile visibility. The flight reported over the Colts Neck VOR at 2253 35 and was cleared to descend from 6,000 to 1,500 feet. Several vectors were given to position PAA 212 on the inbound heading to the Outer Marker (OM). At 2256.15 while on a heading of 040°, the crew reported reaching 1,500 feet, airspeed 180. Several delaying vectors were given to position the aircraft three and one-half miles behind a DC-8 which was landing ahead. At 2259.45 the JFK local controller transmitted to PAA 212: "Clipper two one two this is Kennedy Tower, report passing outer marker, straight in four right, wind calm, runway visual range, all aircraft copy, four right is more than six thousand."

Prevailing visibility at the JFK Airport was less than three miles, therefore the Precision Approach Radar (PAR) Controller was monitoring all ILS approaches to runway 4R as prescribed by procedures.

At 2301.10 the PAR controller advised, "Clipper two twelve, Kennedy radar on localizer one mile from outer marker course and glidepath OK." At 2301:40, PAA 212 reported passing the outer marker and the PAR controller advised, "Clipper two twelve two miles from touchdown." The local controller transmitted at 2301 45 "Clipper two one two, Kennedy Tower cleared to land four right, traffic will be clear in five seconds." PAR at 2302.10 advised "Clipper two twelve, Kennedy radar, execute a missed approach if you do not have the runway in sight." Immediately following this transmission, PAA 212 acknowledged "Uh. . . Roger two one two." The next radio transmission was at 2303:10 when the local controller called the flight but was unable to establish radio contact.

After touchdown the aircraft continued down and off the runway across the asphalt overrun and through a sandy area before coming to rest in the shallow water of Thurston Basin approximately 800 feet from the far end of runway 4R. When the aircraft came to rest the crew proceeded aft to assist the passengers. The main forward (left) cabin door was opened and the passengers in this section of the aircraft left through this door. The passengers in the aft section left through the overwing exits onto the wings; and others left through the two rear doors and got into two life rafts that had been launched. Evacuation of the aft section of the aircraft was completed in approximately five minutes. After seats and debris had been removed from the first-class compartment aisle, some of the persons who had been in the aft section of the aircraft reentered the aircraft and left through the main forward cabin door.

Subsequent to the initial evacuation the captain returned to the cockpit "to put things in order." He did not recall exactly what items he changed, however, he did remember placing the speed brake handle in the forward (retract) position. The flight engineer stated he also returned to the cockpit and pulled the four firewall shut off handles, moved the four fuel valve switches to "close," turned the battery switch to "off," and silenced the fire bell by pulling its circuit breaker.

The PAR controller stated that PAA 212's approach was routine until approximately one mile from touchdown. At that point the aircraft appeared to level off or climb. Shortly thereafter the aircraft's radar target rapidly left the glide slope, and appeared outside the safety zone line above the glide slope. The PAR controller said he then transmitted an advisory to execute a missed approach if runway was not in sight. The target thereafter appeared to descend rapidly toward the touchdown point on the glide slope, remaining above the glide slope until it disappeared into the ground clutter surrounding the touchdown point on the runway.

The local controller stated that no visual contact was established with PAA 212 during the approach or landing as no portion of runway 4R was visible from the tower cab due to low visibility in that direction. The traffic on the runway was being observed on the Airport Surface Detection Equipment radar (ASDE). Following observation of the DC-8 turn off at the far end of runway 4R, a fast moving target was observed on the runway briefly but disappeared at the far end.

The captain of Flight 212 stated . . . "At approximately the outer marker I glanced up and could observe the runway and the glow of the 'strobe' lights associated with the approach light system. It was apparent that the fog stopped at about the shoreline and also that the RVR of 6,000 plus was accurate for all practical purposes. I could see the entire runway. I elected to discontinue the approach on instruments and to continue visually. I leveled the aircraft so as to get over the fog bank overlying the approach light system. Shortly thereafter I called for and received 50° flap. As we crossed the threshold I pushed the airplane down and squared away for the landing. The airplane went on smoothly and applied speed brakes immediately, reverse thrust, and brakes were applied after the spoilers were raised. Brakes were applied and were without effect. Power in reverse was increased to maximum available. Deceleration was not satisfactory, and the airplane continued down the runway. It became apparent that we would go off the end. . . ."

The copilot stated. . . "As we passed through the 1,000-foot level I checked my instruments against the captain's; we were on course and glide slope and the airplane seemed to be set up properly for an instrument approach. I could see the

runway and the glow of the condenser discharge lights. The approach altitude was maintained and instruments were scanned alternately with checks being made through the windshield to approximately the middle marker with the glide slope noted as riding higher and the captain so informed. As it was noted that we were getting increased deflection on the glide slope I looked over and to all appearances the captain had gone off instruments and was in process of completing the approach by visual reference. . . we touched down gently. . . ."

The flight engineer said. ". . . We arrived Dulles Airport with 28,000 pounds of fuel. . . added to a level of 60,700 pounds. . . during the approach to 4R at 'JFK' Airport, the VOR localizer and glide slope functions appeared on both #1 and #2 systems. . . all checklist items completed and a bug speed^{2/} selected for what we estimated would be maximum gross landing weight. This called for a threshold speed of 144 knots and both pilots set their 'bugs' accordingly. . . copilot called out on three occasions that we were high on glide slope . . . made contact with the runway and as the captain pulled all power levers to reverse, I advised that we had four lights and 70 per cent followed rapidly by 85-95-100 per cent . . . powerplants responded well and the reverse thrust was symmetrical . . . believe that I could feel the brakes cycle several times . . . runway appeared quite wet. . . ."

The flight crew also stated that they had not experienced any mechanical difficulty with the aircraft prior to the accident. This crew had flown 7.08 hours within the last 24-hours.^{3/}

All five of the flight attendants plus the five company flight attendants who were traveling non-revenue from San Juan to New York agreed that the approach and touchdown at JFK Airport were normal. The senior flight attendant described the landing as follows: "The landing felt normal but we continued to move rapidly after the sound of reverse thrust and the sensation of hard braking." Another flight attendant stated "We touched down, rolled some and then reverse thrust was applied. The plane dipped to one side, more reverse thrust was applied. . . ."

The captain of the DC-8 that landed approximately one minute ahead of PAA 212 described his approach and landing in part as follows: "Below 300 feet, probably about 250 feet, we entered thin stratus and lost all forward visibility. At 200 feet on glidepath boundary and runway lights became visible . . . I had the impression we were landing down wind . . . braking was fair . . . foot thumpers^{4/} were still warning of slippery surface . . . runway was wet."

Current ATC procedures permit the use of prescribed or normally used runways even though a tail wind component is present, provided the wind is not in excess of four knots. Under such conditions, wind direction and velocity shall be stated.

Following notification of the accident, Federal Aviation Agency (FAA) Systems Maintenance Service personnel performed required ground checks on facility radar

^{2/} Bug speed is a manually operated pointer.

^{3/} Section 40.320(b) of the Civil Air Regulations provides "An air carrier shall not schedule any flight crew member for duty aloft for more than 8 hours during any 24 consecutive hours, unless he is given an intervening rest period at or before the termination of 8 scheduled hours of duty aloft. . . ."

^{4/} The foot thumpers indicate to the pilot that the anti-skid system is cycling and warn him to adjust brake pedal force.

equipment and the ILS serving runway 4R at JFK Airport. The equipment was found to be functioning normally. A flight check of the ILS was made by the FAA on April 8, 1964, and it too was found to be operating normally.

A weather observation taken by the U. S. Weather Bureau at 2254 (9 minutes prior to the accident) in part contained the following. 300 feet thin broken, measured 1,400 feet overcast, visibility 1-1/2 miles, fog, temperature 47°F, dew point 47°F, wind 210°, 4 knots, altimeter setting 29.72 inches, runway 31L RVR 2,000, runway 4R RVR 6,000. The next observation taken at 2314 (11 minutes after the accident) in part contained the following. 100 feet thin broken, measured 1,400 feet overcast, visibility 1-1/2 miles, fog, temperature 47°F, dew point 47°F, wind 230°, 6 knots, altimeter setting 29.73 inches, runway 4R RVR 2,600. The 2300 upper wind observation at JFK Airport showed the wind at the 1,000-foot altitude to be from 280° true at a velocity of 26 knots.

Runway 4R at JFK Airport is 8,400 feet long and 150 feet wide. The runway surface is paved concrete with a 120-foot asphalt overrun extending beyond the far end of the runway. The lighting system includes approach lights with sequence flashers, high intensity runway lights, and touchdown zone lights. The touchdown zone lights extend along the first 3,000 feet of the runway with runway centerline lights starting at the 3,000-foot mark and continuing to the far end of the runway. The high intensity lights extend along the entire length of the runway on both sides. All lights were on and operating normally at the time of the flight's approach and landing.

No ground witnesses could be located who had observed the approach and landing of PAA 212.

The initial touchdown of the aircraft could not be determined by visual examination of the runway surface. The first discernible marks that could be associated with PAA 212 were identified as those made by the left main landing gear (MLG) tires. These were whitish scrub marks and began at a point 7,600 feet from the approach end of runway 4R and continued to a point on the asphalt overrun 14 feet beyond the end of the runway. Whitish scrub marks identified with the right MLG could be distinguished as commencing 8,300 feet from the approach end of runway 4R and also continuing 14 feet beyond the end of the runway. These marks showed that the aircraft veered slightly to the left of the runway centerline shortly before passing over the macadam blast pad at the end of the runway. No nose gear tire marks could be detected on the runway.

Examination of the aircraft revealed that the forward section of the fuselage was practically severed from the remainder of the aircraft around the entire circumference at approximately fuselage station 600. General distribution and orientation of shear wrinkles in the skin forward of the fracture and structural components at the fracture indicate a compressive load was exerted on the forward fuselage section at the time of impact with the water. Other parts of the aircraft received varying degrees of damage from major to none. All spoilers remained intact with the exception of the inboard ends of the inboard spoilers which were damaged by the adjacent trailing edge structure when the trailing edge structure was pushed upward by the inboard flap carriages and tracks causing the inboard foreflaps to contact the spoilers. Matching interference marks corresponded to the spoilers being in the retracted position at the time of occurrence.

The speed brake (spoiler) lever in the cockpit was found in the full forward position. Movement of this lever did not produce any cable movement aft of station 41. Investigation disclosed that this was due to the cables being restricted by crushed metal in the area and being slack of the restriction as a result of upward crushing of the lower fuselage structure in the nose wheel area. Examination of the speed brake (spoiler) system, including operational functional tests on components, failed to reveal any evidence that would have precluded normal operation prior to water impact. The landing gears were down and locked, and the flaps were fully extended (50°) at time of impact with the water. The Nos. 1, 3, and 4 engines separated from the aircraft at water impact. Examination of the aircraft structure, powerplants, and flight control systems revealed no evidence of failure or malfunction prior to impact with the water.

The aircraft brake system, including the anti-skid device, was examined and functional tests were conducted on the components. This examination disclosed no evidence that would have precluded normal brake operation prior to impact with, and submersion in, the salt water of Thurston Basin.

Measurement of the remaining tread depth on each of the MLG tires revealed the following:

	<u>Left MLG</u>		<u>Right MLG</u>	
	<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	<u>No. 4</u>
Front tires	.100"	.234"	.218"	.109"
Rear tires	.234"	.281"	.072"	.062"

The following has been extracted from test data submitted by the Boeing Company in response to a request by the Civil Aeronautics Board.

Wet Runway Stopping Distance

Model 707-139 with JT3C-6 engines
 50° flaps with gear down
 Zero wind and zero runway slope
 Sea level, standard day

<u>Gross Wt.</u>	<u>Brakes</u> (Anti-skid on)	<u>Max Rev</u> <u>Thurst</u>	<u>Spoilers</u> 60 degrees (fully extended)	<u>Stopping distance</u> <u>from touchdown</u>	
				<u>Smooth</u> <u>tires</u>	<u>New</u> <u>ribbed</u>
196,000 lbs.	Yes	Yes	Yes	4,150 ft.	2,750 ft.
196,000 lbs.	Yes	Yes	No	4,350 ft.	3,050 ft.
190,000 lbs.	Yes	Yes	Yes	4,000 ft.	2,650 ft.
190,000 lbs.	Yes	Yes	No	4,250 ft.	2,950 ft.

These distances were calculated utilizing approach and touchdown speeds of 146.6 and 142.2 knots IAS respectively, for a gross weight of 196,000 pounds and 144.3 and 140.0 knots IAS for 190,000 pounds. The following assumptions were also used in the calculations:

1. When spoilers are used, reverse thrust is initiated three seconds after touchdown.
2. When spoilers are not used, reverse thrust is initiated two seconds after touchdown.
3. Full reverse is achieved eight seconds after throttle movement.

The flight recorder tape on PAA 212 was removed and a readout was conducted on that portion of the tape representing approximately the five minute period before touchdown. (See Attachment #1). During this time period, the parameters showed no evidence of abnormality in their functioning. The readout shows that approximately 12 seconds prior to touchdown the aircraft was at an altitude of 400 feet above mean sea level (MSL) and at an indicated airspeed (IAS) of 178 knots; the IAS at touchdown was 160 knots. JFK Airport is 12 feet above MSL

Analysis

The aircraft, its powerplants, and systems were operating normally at the time the accident occurred.

An error in the dispatching of PAA 212 out of Dulles International Airport resulted in an actual takeoff gross weight of 208,282 pounds which was 6,282 pounds greater than that specified in the company's release from New York for the Dulles departure. Predicated on the computed dry tank weight of the aircraft (149,502 pounds) and the amount of fuel removed from the aircraft (46,986 pounds) the gross weight of N779PA at the time the accident occurred was 196,488 pounds. This was 6,488 pounds in excess of the maximum allowable gross weight for landing at JFK Airport. The 46,986 pounds of fuel removed from PAA 212 subtracted from the fuel aboard at takeoff from Dulles, 58,780 pounds, was 11,794 pounds, the amount burned off in flight. This was compatible with the 12,000 pounds estimated to be burned off.

Based on the reported surface wind of 210° at 4 knots 9 minutes prior to the accident and 230° at 6 knots 11 minutes after the accident, it is believed that PAA 212 landed at JFK Airport with an average tailwind component of 5 knots. The only wind information given the crew by FAA ATC personnel was by the local controller approximately two minutes prior to touchdown when he reported the wind "calm." 5/

The wet runway surface afforded fair to poor braking at best as attested to by the crew of PAA 212, the captain of the DC-8 that landed ahead of PAA 212, and examination of the whitish scrub marks left by the MLG tires of N779PA. The lack of nose gear tire marks, coupled with the whitish scrub marks made by the left and right MLG tires, shows that there was some braking effect although poor

For all practical purposes the tires on the right MLG were smooth as opposed to relatively new ribbed tires on the left MLG. The rear tires of tandem installations produce most of the braking on wet runways. Where directional control was

5/ AT P 7110.1A, para. 417.1B stated in part, "When the surface wind velocity is less than five knots, the runway prescribed or normally used as the 'calm' runway, due to length, better approach, shorter taxiing distance or other reasons, in which case the wind direction and velocity shall be stated since some aircraft are not approved for takeoff or landing when a tailwind component is present "

maintained as the aircraft proceeded down the runway, braking efficiency would have been limited by the effectiveness of the right MLG tires. The new ribbed tires on the left MLG probably accounted for the swerve to the left near the end of the runway as these tires would brake more effectively than the right tires as the aircraft slowed.

Although the captain stated that he extended the speed brake (spoilers) after touchdown, and in all probability believed that he did, the physical evidence showed that the spoilers were retracted at the time of impact with the water.

The fog bank involved extended at least to the approach end of runway 4R as shown by the RVR on runway 31L of 2,000 feet at 2254 and 2,600 feet on runway 4R at 2314. Reduction to these distances could only have occurred as a result of the fog. The extended centerline of the approach end of runway 31L is in proximity and crosses the approach end of runway 4R.

The captain stated " . . . As we crossed the threshold I pushed the airplane down. . . " An analysis of the flight recorder readout shows this pushover occurred at an altitude of 400 feet and 12 seconds prior to touchdown. Using the average airspeed from threshold to touchdown of 169 knots and adding a 5 knot tailwind, the aircraft was making a ground speed of 174 knots for the 12 seconds prior to touchdown. At this speed, and for this length of time, computations show that this aircraft would have touched down about 3,516 feet from the threshold, and would have left the surface of the runway at an indicated airspeed of approximately 82 knots. An increase in the magnitude of "G" trace deflections occurred 23 seconds after touchdown when the trace went from $-.025$ "G's" to 2.52 "G's."

At the average groundspeed of 132 knots (127 knots IAS plus 5 knot tailwind) for the 23 seconds following touchdown, PAA 212 would have traveled 5,120 feet on the runway. This distance subtracted from the length of the runway shows that the touchdown point was 3,280 feet from the approach end of runway 4R. From a touchdown groundspeed of 165 knots (160 knots IAS plus 5 knot tailwind), the aircraft decelerated to 142 knots groundspeed during the next 10 seconds at an average speed of 151 knots. At this average speed for 10 seconds, PAA 212 would have traveled 2,543 feet. This distance added to the lesser of the computed touchdown points (3,280 feet) and subtracted from the length of runway 4R (8,400 feet) shows that when PAA 212 reached a groundspeed of 142 knots, there was only 2,577 feet of remaining runway.

Boeing test data indicate that under conditions of wet runway at sea level zero wind, 196,000 pounds gross weight, anti-skid brakes on, attainment of maximum reverse thrust within 10 seconds after touchdown, spoilers retracted, smooth tires, and a touchdown speed of 142.2 knots IAS, 4,350 feet of runway is required to stop the aircraft.

Examination of these data further shows that the elimination of any of the adverse factors related above would not have prevented the aircraft from overrunning the runway.

Probable Cause

The Board determines that the probable cause of this accident was the captain's deviation from the glide slope during an ILS approach resulting in a touchdown on the runway at a point and speed which precluded stopping the aircraft on the remaining runway

BY THE CIVIL AERONAUTICS BOARD.

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

S U P P L E M E N T A L D A T A

Investigation

The Civil Aeronautics Board was notified of this accident on April 7, 1964, through its New York Safety Investigation Office.

Washington Office personnel were immediately notified and an investigation was initiated and conducted in accordance with the provisions of Title VII of the Federal Aviation Act of 1958, as amended.

Air Carrier

Pan American World Airways, Inc., is a New York Corporation with its principal offices in New York City. The carrier holds a current certificate of public convenience and necessity issued by the Civil Aeronautics Board and a current operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to engage in air transportation of persons, property, and mail within the United States including the route involved.

Flight Personnel

Captain Herbert H. Dunker, age 47, was employed by Pan American World Airways on March 23, 1942, and had accumulated a total of 14,629 hours flight time, of which 711 hours were in Boeing 707 aircraft. He held currently effective FAA airline transport pilot certificate No. 120899 with numerous ratings among which was in the Boeing 707. His last line check in Boeing 707 aircraft was on January 9, 1964. His last proficiency check in Boeing 707 aircraft was on December 26, 1963. Records indicate he satisfactorily passed a first-class FAA flight physical on December 19, 1963, without waivers.

First Officer Howard L. Grandy, age 47, was employed by Pan American World Airways on June 11, 1945, and had accumulated a total of 10,433 hours of flight time, 141 of which were in Boeing 707 aircraft. He held currently effective FAA airline transport pilot certificate with several ratings among which was the Boeing 707. His last line and proficiency check was accomplished in Boeing 707-720 aircraft on October 21, 1963. Records indicate he satisfactorily passed a first-class FAA flight physical July 30, 1963, without waivers.

Second Officer George H. Mueller, age 36, was reemployed by Pan American World Airways on November 13, 1963, and had accumulated 5,000 hours flight time of which 33 hours were in Boeing 707 aircraft. He held currently effective commercial pilot certificate No. 1252683 with airplane single and multiengine land flight instructor airplane, and instrument ratings. His last check after training was accomplished on March 28, 1964.

Flight Engineer Joseph L. Hunt, age 44, was employed by Pan American World Airways on October 16, 1948, and had accumulated 11,303 hours flight time as engineer, of which 192 hours were in Boeing 707 aircraft. He held currently effective FAA flight engineer certificate No. 1118302. He received his last recurrent flight check on February 18, 1964, and on February 19, 1964, was designated by FAA as a check airman on Boeing 707 aircraft.

Flight Service Attendant Patricia E Grubb was employed by Pan American World Airways on April 12, 1948. She completed the last jet emergency training course on December 3, 1963. She satisfactorily passed a company physical examination on October 7, 1963.

Flight Service Attendant Bonnie L. Dean was employed by Pan American World Airways on March 3, 1963. She completed the company jet emergency training course on October 14, 1963, and satisfactorily passed a company physical examination on March 6, 1964.

Flight Service Attendant Helen K. Koehl was employed by Pan American World Airways on October 3, 1963. She completed the company jet emergency training course on November 13, 1963, and successfully passed the company physical examination on August 12, 1963.

Flight Service Attendant Elizabeth T Conlan was employed by Pan American World Airways on November 24, 1961. She completed the company jet emergency training course on December 3, 1963, and successfully passed the company physical examination on January 13, 1964.

Flight Service Attendant Maria B. Gonzales was employed by Pan American World Airways on October 13, 1958. She completed the company jet emergency training course on April 3, 1964, and successfully passed the company physical examination on March 22, 1963.

Aircraft

N779PA, a Boeing 707-139, manufacturers serial number 17904 owned and operated by Pan American World Airways, Inc., Pan American Building, New York 17, New York, was manufactured in May 1960, and had a total flying time of 11,094 hours of which 563 hours had been accumulated since the last major inspection. The aircraft was powered by four Pratt & Whitney Model JT3C-6 engines. Engine Times were as follows.

<u>Engine Position</u>	<u>Time Since Overhaul</u>	<u>Total Time</u>
1	501:35	7354:16
2	388:33	9596:30
3	1357.01	698 14
4	1895.49	10,725:57

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