Turbulence injuries, Pan American World Airways, Inc., Boeing 747-121, N739PA, near Nantucket, Massachusetts, November 4, 1970

Micro-summary: **This Boeing 747-121 encountered severe turbulence during climb, injuring several people.**

Event Date: **1970-11-04 at 2146 EST**

Investigative Body: **National Transportation Safety Board (NTSB), USA**

Investigative Body's Web Site: **http://www.ntsb.gov/**

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SA-NONE

FILE NO. 1-0001

AIRCRAFT ACCIDENT REPORT

PAN AMERICAN WORLD AIRWAYS, INC.
BOEING 747-121, N739PA
NEAR NANTUCKET, MASSACHUSETTS
NOVEMBER 4, 1970

Adopted: May 3, 1972

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20591
Report Number: NTSB-AAR-72-14

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20591
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Adopted: May 3, 1972

PAN AMERICAN WORLD AIRWAYS, INC.
BOEING 747-121, N739PA
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SYNOPSIS

Pan American World Airways, Inc., Flight 114, a Boeing 747-121, N739PA, was a scheduled passenger flight originating at John F. Kennedy International Airport (JFK), New York, on November 4, 1970. Its destination was Orly Airport, Paris, France. There were 148 passengers and a crew of 15 aboard the flight.

The takeoff at 2117 e.s.t. was uneventful. The flight had been cleared to 31,000 feet, and turbulence during the climb to approximately 27,000 feet was described by the flightcrew as an occasional "nibble." At approximately 2146 e.s.t., the aircraft encountered moderate to briefly severe turbulence at about 27,000 feet as it passed Nantucket, Massachusetts. During the encounter, which lasted approximately 4 minutes 10 seconds, 21 passengers and two stewardesses sustained injuries which ranged from minor to serious. The seatbelt sign was on at the time of the encounter and had been on since takeoff.

At 2207 e.s.t., the flightcrew requested clearance back to JFK Airport and later requested and received preferential air traffic control handling. The aircraft landed on Runway 31R at 2339 e.s.t.

The National Transportation Safety Board determines that the probable cause of this accident was the entry of the aircraft into an area of moderate to briefly severe turbulence associated with convective activity while numerous occupants were unsecured by seatbelts, even though the seatbelt sign was lighted.

As a result of the investigation of this accident, the Safety Board sent a letter to the Federal Aviation Administration on April 28, 1971, recommending improvements or corrective action in the following areas: seatbelt discipline, Boeing 747 overhead bin locking mechanisms, economy seat headrests, narrow aisle stretchers, and air carrier policy on deviation of flight. The Administrator's response on May 7, 1971, indicated that appropriate action had been taken on most of the Board's recommendations, and that action had been initiated on the remaining items. Copies of the Board's letter of recommendation and the Administrator's response were also transmitted to interested parties, such as operators of the Boeing 747, appropriate airport managers, The Boeing Company and the Flight Safety Foundation, for their information and consideration.

INVESTIGATION

Pan American World Airways, Inc. (PAWA), Flight 114, a Boeing 747-121, N739PA, was a regularly scheduled passenger flight between John F. Kennedy International Airport (JFK), New York and Orly Airport, Paris, France, on November 4, 1970. There were 148 passengers and a crew of 15 aboard the flight. The scheduled departure time from JFK was 2030.[1] In accordance with company policy and procedures, the crew was provided with appropriate dispatch information including the current and forecast en route weather. The flight departed

[1] All times herein are eastern standard based on the 24-hour clock.

from the terminal at 2044 and took off on Runway 4L at 2117.

According to the crew, the climbout was normal and turbulence was described as an occasional "nibble." The autopilot was on heading mode during the climb. The number 1 airborne weather avoidance radar "spoked" badly when first turned on and was deemed unusable. The number 2 radar was turned on and functioned properly according to the crew. The captain reported seeing lightning to the north (left) and the radar showed some cells about 40 miles to the left.

PAWA Flight 114 had been cleared to 31,000 feet via Jet Route J62 to Nantucket and J585 to Yarmouth, Nova Scotia, and according to the flightcrew was climbing through 28,000 feet over Nantucket when severe turbulence was encountered.

When the severe turbulence was encountered at 2146, the captain changed the autopilot from heading mode to turbulence mode and made a power reduction. The captain stated that he remained close to the controls during the descent, after placing the autopilot on turbulence mode; however, he did not interfere because the autopilot was doing an excellent job of maintaining attitude.

At 2147 Boston Air Route Traffic Control Center was advised by Flight 114 that it was in an area of turbulence and was descending through an altitude of 25,000 feet. During the descent, the aircraft reentered clouds and the nacelle anti-ice was turned on. At 2149, the flight reported levelling out at 23,000 feet. At approximately 2151, Flight 114 reported to Boston Center that it was out of 22,500 feet and commencing a climb. At 2204, the flight reported level at 31,000 feet and Boston Center replied, "Clipper 114, you are by the Davey Intersection,[2] radar service is terminated, flight level 310, contact Moncton Center 133.6, goodnight."

At approximately 2207, Flight 114 requested clearance back to New York from the Moncton Control Center. That clearance was approved. The flight subsequently requested vectors around the turbulence from Boston Center and later requested and received preferential air traffic control treatment. The flight returned to JFK without further incident and landed on Runway 31R at 2339.

The seatbelt sign was on at the time the flight encountered the severe turbulence and had not been turned off since the departure from JFK. According to the stewardesses, some of the passengers had been instructed personally to remain seated; however, there were others who were moving about in the cabin at the time of the occurrence. There were no announcements from the flight deck to explain why the seatbelt sign had not been turned off, or how long it would remain on.

After the aircraft landed, difficulty was encountered in removing from the aisle persons suspected of having back injuries, because the aisle widths were too narrow for standard stretchers.

Twenty-one passengers and two stewardesses suffered injuries during the turbulence encounter. Six passengers and one stewardess were hospitalized. The other injured passengers were given emergency room care and were released.

Two of the hospitalized passengers were interviewed. Both of these passengers struck the ceiling with their heads and then fell back down into their seats. This occurred with the first excursion of the aircraft and they were able to maintain their seated positions during the remaining turbulence.

The hospitalized stewardess was interviewed. She stated that she had started to prepare the rear galley for beverage service when she felt some mild turbulence. She observed that the seatbelt sign was still on and started to return to her seat. She had just stepped out of the galley alcove area when the initial severe turbulence was encountered. She struck her head on the ceiling and fell hard to the floor. During the remaining period of turbulence, she remained on the floor and held on to seat legs to prevent being thrown about. She suffered a cerebral

[2] The Davey Intersection is 150 nautical miles northeast of the Nantucket VORTAC.

concussion and back sprain and was unable to perform her duties for the remainder of the flight.

Injury information derived from passenger questionnaires, crew statements, and interviews of hospitalized persons is as follows:

Location of Person	Position	Seatbelt Used	Extent of Injury
Row 31	Standing	--	Minor
Row 37	Seated	No	Serious
Row 41	Standing	--	Serious
Row 41	Standing	--	Serious
Row 43	Seated	No	Minor
Row 45	Standing	--	Serious
Row 49	Seated	No	Serious
Rear of Aircraft	Seated	Yes	Serious

Four persons standing in the forward portion of the cabin (one in Row 7, two in Row 6 and one at the cockpit door) were uninjured, while the eight injured persons described above were located aft of the midline of the cabin. The location of the other injured passengers is not known.

After the aircraft landed, it was inspected in accordance with the manufacturer's recommended procedures and no discrepancies were noted except for minor cabin interior trim damage. During the turbulence encounter, several overhead storage bins dropped open, spilling their contents into the cabin, and several headrests in the economy section became detached from their seat units. The aircraft was released for service after appropriate repairs and replacements. Included in the items replaced were the receiver/transmitter unit and the waveguide switch of the number 1 weather avoidance radar, since the flightcrew had reported the number 1 radar set to have been unusable.

According to the dispatcher's release, the gross weight of Flight 114 at takeoff was 616,200 pounds and the computed center of gravity was 17.5 percent MAC (Mean Aerodynamic Chord). The estimated gross weight at the time of the accident was 590,000 pounds. The estimated fuel load was 187,000 pounds.

The total gross weight was less than the allowable gross weight of 710,000 pounds and the c.g. (center of gravity) was within limits.

The landing gross weight of 547,200 pounds was below the maximum allowable gross weight of 564,000 pounds.

The 2200 surface weather chart showed a deep low-pressure system centered near New York City with an occluded front extending eastward from the low-pressure center to about 50 miles south of Nantucket, then southeastward.

The 1900 500-millibar chart showed a deep low-pressure system centered over Chesapeake Bay, with the axis of maximum southwesterly winds located well to the east of Nantucket.

The 1900 300-millibar chart showed a deep low-pressure system centered over northwestern North Carolina with the axis of maximum southwesterly winds located east of Nantucket.

Surface weather observations from selected stations were, in part, as follows for the times indicated:

Nantucket

2055, Record Special, measured 1,700 feet overcast, visibility 5 miles, moderate rain, wind 090° 15 knots, altimeter setting 29.49 inches.

2155, Record Special, measured 700 feet overcast, visibility 4 miles, moderate rain, wind 090° 12 knots, altimeter setting 29.43 inches, pressure falling rapidly.

New Bedford

2100, measured 1,200 feet overcast, visibility 7 miles, very light rain, temperature 51°F, dew point 48°F, wind 080° 8 knots, altimeter setting 29.53 inches.

*2200,*Record Special, measured 500 feet overcast, visibility 5 miles, very light rain, fog, temperature 50°F, dew point 50°F, wind 090° 7 knots, altimeter setting estimated 29.47 inches, ceiling ragged.

Hyannis

2100, estimated 6,000 feet overcast, visibility 8 miles, light rain, temperature 51°F,

dew point 43°F, wind 070° 10 knots, altimeter setting estimated 29.52 inches, pressure falling rapidly.

2200, estimated 5,000 feet overcast, visibility 7 miles, light rain, temperature 50°F, dew point 46°F, wind 070° 13 knots, gusts 18 knots, altimeter setting estimated 29.45 inches, pressure falling rapidly.

A pilot weather report contained in the Boston 2225 pilot report summary follows:

Nantucket at 2200 at Flight Level 330 severe turbulence, necessary to descend to Flight Level 220, VC10.

The Brunswick, Maine, 2140 radar weather observation showed, in part a broken area of weather echoes generally northeast of Nantucket with the southwest edge bordering the area where the turbulence encounter occurred.

The New York City 2143 radar weather observation and the associated radar overlay showed that at about the time of the turbulence encounter; Flight 114 was flying through area described, in part, as follows: broken area of echoes containing thunderstorms producing heavy rain showers, no change in intensity last hour, maximum tops of detectable moisture 26,000 feet, most tops below 20,000 feet, system moving from 180°, 15 knots.

The New York and Portland, Maine, 1900 winds aloft observations were in part, as follows:

Height (thsds. ft. m.s.l.)[3]		Direction (°true)	Velocity (kts.)
	New York		
25		140	35
27		140	28
28		140	26
30		185	38
	Portland		
25		220	27
28		220	25
30		220	35

[3]Mean sea level

The New York 1900 radiosonde ascent (below 29,500 feet m.s.l.) generally showed intermittent layers of conditionally unstable and stable air with mostly moist conditions except for dry air above about 25,000 feet m.s.l. The freezing level was near 6,800 feet m.s.l. and the tropopause was near 29,400 feet m.s.l.

The area of forecast responsibility of the Weather Service Forecast Office at Boston included Northeastern New York, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and the coastal waters. The aviation area forecast issued by that office at 1940, valid for a 12-hour period beginning at 2000, called in part, for a chance of embedded thunderstorms developing over Massachusetts, Rhode Island and adjacent waters, with flight precautions recommended because of low ceilings and visibilities, as well as turbulence. The forecast indicated various cloud layers to 30,000 feet, rain and fog restricting low-level visibilities, and scattered thunderstorms developing to 35,000 feet. Moderate icing was anticipated in clouds above 7,000 feet over southeastern Massachusetts. Occasional moderate turbulence was expected below 20,000 feet over southern New England, developing northward, with moderate clear air turbulence forecast to develop between 20,000 and 40,000 feet over New England and the coastal waters.

The Weather Service Forecast Office at New York issued an inflight Advisory, SIGMET Lima 1, valid from 1600-2200, which described an active area of thunderstorms, called for tops 40,000 to 45,000 feet, isolated tops to 55,000 feet and forecast the area to move north-northwest at 20 knots. The area delineated was lying generally south and east of Nantucket; however, the direction of movement was toward the area of the turbulence encounter.

The Weather Service Briefing Office at JFK provided weather documentation for the flight, which included appropriate terminal forecasts, significant weather prognostic chart, 300-millibar prognostic chart, and tropopause-vertical wind shear prognostic chart. The significant weather prognostic chart forecast moderate

turbulence below 37,000 feet over the area of concern.

A readout of the flight data recorder showed that the aircraft was in an area of turbulence for approximately 4 minutes 10 seconds. The maximum intensity occurred during the first 10 seconds when "g" forces of approximately plus 1.65 to minus .83 were encountered.

The altitude trace showed that the aircraft was climbing through 27,150 feet when the turbulence was encountered. Approximately 8 seconds later the aircraft was still climbing and was passing through 27,300 feet, when the maximum intensity occurred. The aircraft continued to climb for 17 seconds and reached a maximum altitude of 28,270 feet. The aircraft then began a descent that continued to 22,800 feet and coincided with the end of the turbulence.

The indicated airspeed trace showed the airspeed to have been 354 knots at the time of the initial encounter. The airspeed decreased during the next 8 seconds and was near 343 knots when the maximum intensity of the turbulence was encountered. The airspeed varied considerably during the turbulence encounter and reached a low indicated airspeed of 278 knots 33 seconds before the turbulence ended.

The Boeing Company's FAA (Federal Aviation Administration) Approved Airplane Flight Manual for the B-747 recommended the following procedure for penetrating severe turbulent air:

> Flight through severe turbulence should be avoided, if possible. When flying at 30,000 feet or higher, it is not advisable to avoid a turbulent area by climbing over it, unless it is obvious that it can be overflown well in the clear. For turbulence of the same intensity, greater buffet margins are achieved by flying the recommended speeds at reduced altitudes.
>
> Air speed should be approximately 280 knots IAS or 0.82M, whichever is lower. Severe turbulence will cause large, and often rapid variations in indicated airspeed. DO NOT CHASE THE AIR SPEED. Engine ignition should be on. Make an initial thrust setting for the target airspeed. CHANGE THRUST ONLY IN CASE OF EXTREME AIR SPEED VARIATION.
>
> Use of the autopilot turbulence penetration mode is recommended for autopilot operation in severe turbulence. In this mode the attitude and rate gains are reduced. Additionally, use of the yaw damper with the autopilot "TURB" mode will aid in maintaining stable control and in reducing structural loads.

The recommended procedures for manually controlled flight in severe turbulence are:

> **Attitude**
>
> Maintain wings level and the desired pitch attitude. Use the attitude indicator as the primary instrument. In extreme drafts, large attitude changes may occur. DO NOT USE SUDDEN LARGE CONTROL INPUTS. After establishing the trim setting for penetration speed, DO NOT CHANGE STABILIZER TRIM.
>
> **Altitude**
>
> Allow altitude to vary. Large altitude variations are possible in severe turbulence. Sacrifice altitude in order to maintain the desired attitude and airspeed. "DO NOT CHASE ALTITUDE."

Subsequent to this accident, there have been two other Boeing 747 turbulence-associated accidents. One involved another PAWA flight and the other involved another carrier. Accordingly, the Safety Board's investigation of this accident included an engineering review of B-747 airplane structural response and autopilot data, to ascertain what effect, if any, the structural vibratory modes or the autopilot may have had on the ultimate severity of the accelerative loadings experienced in turbulence. Acceleration frequency response data supplied by the manufacturer indicated clearly the existence of the fundamental wing mode at about 1 cycle per second (c.p.s.), and the fundamental fuselage mode at about 3 c.p.s. Power spectral density data disclosed no significant response differences between autopilot on and autopilot off, i.e., the

autopilot did not serve to drive the fuselage or to increase load factor as a result of elastic structural interplay or resonance. Additional flight test data relating to accelerations in turbulence indicate that the elastic vibratory response of the airplane structure may contribute slightly to the steady state or "long term" load factors experienced in turbulence. However, the inertial effect of this response is rather insignificant with respect to any large scale physical displacement of objects or persons, since the very short time period over which such induced load factors act minimizes their effect, even in the worst case where a critically tuned gust might excite the structure.

A significant variation of load factor with airplane longitudinal station was also disclosed during the investigation. A simulation analysis by the manufacturer of B-747 and B-707 response to vertical down gusts of various shapes and equivalent maximum amplitudes of 50 feet per second disclosed considerable similarity between the two airplanes. Load factors resulting from the simulation were recorded for the pilot station, the airplane center of gravity station, and the aft pressure bulkhead station. It was found that with the airplanes loaded at forward center of gravity positions (16% MAC), the ratio of the incremental load factors sustained at the aft pressure bulkhead to those experienced at the pilot's station was 1.5 for the rigid structure. The variations in load factor stem from the aircraft's combined rotational and translation motions. It was estimated that this ratio could increase to as much as 2.2 if the structure were acted upon by a critically tuned gust. These differing load factors at different longitudinal positions might result in considerable variance in a person's response to, and interpretation of the severity of the turbulence, depending on his location.

ANALYSIS

PAWA Flight 114 of November 4, 1970, was routine as it proceeded toward Nantucket. The flight was in and out of clouds during the climb to 27,150 feet, but was in the clear when moderate to severe turbulence was encountered.

The seatbelt sign was on constantly after takeoff because of light turbulence encountered during the climb. Most of the injuries were sustained by persons not secured by seatbelts. The passengers probably began moving about in the cabin because of the extended period of time the seatbelt sign remained on, with only light turbulence experienced and because no explanation from the flight deck was made as to why the seatbelt sign had not been turned off. PAWA policy permits stewardesses to move about in the cabin at their own discretion when the seatbelt sign is on, except when specifically requested by the captain to remain seated. Several stewardesses, as well as passengers, were out of their seats when the turbulence was encountered. It has not been determined if the failures of the overhead bins or the detached headrests contributed to individual injuries.

The manufacturer's recommended severe turbulence penetration speed for the B-747 is 280 knots or 0.82 Mach, whichever is lower, and it is also recommended that the autopilot be used on turbulence penetration mode.

The light turbulence encountered during the climbout was not indicative of the jolt which was suddenly encountered at 27,150 feet and could explain the pilot's use of climb airspeed, rather than severe turbulence penetration speed.

The flight data recorder readout indicated that the airplane, on a climbing path averaging up to 6,000 feet per minute over a period of seven seconds, entered an area of moderate to severe turbulence and almost immediately encountered a severe downdraft resulting in a negative load factor of approximately minus .83g. This was followed less than two seconds later by an updraft which caused a positive load factor of 1.65g. The changes in altitude and airspeed were orderly after the initial encounter as a result of crew actions. The aircraft was under control at all times.

The Safety Board's investigation showed that the dynamic response characteristics of the structure and autopilot are sufficiently isolated

so that no adverse interplay occurs during turbulence. The effect of the structural vibratory modes may result in slight additions to the peak "long term" load factors sustained, but the physical displacement of passengers is negligible.

According to the captain, a power reduction was made about the same time that he changed the autopilot to turbulence mode. The Board believes that the loss of altitude shown in the flight recorder readout reflected the power reduction while the autopilot was in the turbulence mode position. It is believed that the power reduction was made in an effort to slow down to the recommended 280 knot turbulence penetration airspeed. During the three minutes after the beginning of the turbulence the flight recorder reflects a decrease and steadying out of airspeed at 280 knots and a loss of altitude from about 27,850 feet to 23,960 feet followed by a marked reduction in the descent rate, finally levelling off at about 22,800 feet at 280 knots.

The turbulence encounter took place ahead of an occluded front and within an area of convective activity. The Board considers that even though the aircraft was clear of clouds at the time of the encounter, it was near the tops of cumulus buildups where strong vertical currents existed.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the entry of the aircraft into an area of moderate to briefly severe turbulence associated with convective activity while numerous occupants were unsecured by seatbelts, even though the seatbelts sign was lighted.

RECOMMENDATIONS

As a result of the investigation of this accident, the Safety Board sent a letter to the Federal Aviation Administration on April 28, 1971, recommending improvements and/or corrective action in the following areas: Seatbelt Discipline, Boeing 747 Overhead Bin Locking Mechanisms, Economy Seat Headrests, Narrow Aisle Stretchers, and Air Carrier Policy on Deviation of Flight. The Administrator's response on May 7, 1971, indicated that appropriate action had been taken on most of the Board's recommendations, and that action had been initiated on the remaining items. (See Appendices B and C.)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

May 3, 1972

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CREW INFORMATION

Captain James N. King held an Air Transport Pilot certificate number 49145-40. The date of his last proficiency check was February 4, 1970. His first class airman's medical certificate was dated July 13, 1970, with the limitation that he must wear glasses when exercising the privileges of this airman's certificate. Captain King had a total of 16,145 flight-hours, of which 511 were in the Boeing 747.

First Officer Francis F. Storm held an Air Transport Pilot certificate number 513902. His last proficiency check was May 13, 1970. His first-class airman's medical certificate was dated January 20, 1970, with no limitations. He had a total of 5,034 flight-hours, of which 238 were in the Boeing 747.

Flight Engineer Thearel Toles held a Flight Engineer certificate number 575001 dated May 15, 1967. He had a total of 13,945 hours, of which 438 were in the Boeing 747.

UNITED STATES OF AMERICA
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: April 28, 1971

Adopted by the NATIONAL TRANSPORTATION SAFETY BOARD
at its office in Washington, D. C.
on the 7th day of April, 1971

FORWARDED TO:
Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Department of Transportation
Washington, D. C. 20590

SAFETY RECOMMENDATION A-71-25 thru 30

As a result of a recent incident involving a Boeing 747 which encountered severe turbulence, six passengers and one stewardess were hospitalized, and 15 passengers and one stewardess were treated for minor injuries. All injuries were the result of the severe turbulence encountered while climbing through flight level 280 at an indicated air speed of 280 knots.

The National Transportation Safety Board believes the following areas require review by the Federal Aviation Administration:

Seatbelt Discipline: During this accident, seatbelt signs were on throughout the flight; however, of two hospitalized passengers, one indicated she did not have her seatbelt fastened, and another had his seatbelt fastened, but it was very loose because he was not able to take up the slack of the belt. Both of these passengers were injured when their heads struck the ceiling on the initial sharp downdraft but were able to maintain their seated position during the remaining turbulence encounter.

The Safety Board recommends that:

1. Seatbelt discipline be strictly enforced when the seatbelt sign is on. Attendants should make a careful visual inspection of all seatbelts before takeoff and offer assistance to anyone encountering difficulty with a snug fit. When the seatbelt sign is on for prolonged periods, a public address announcement should be made at regular intervals.

747 Overhead Bin Failures: During this encounter with turbulence, several of the overhead storage bins in the passenger compartment dropped open, allowing their contents to spill out. It is not known if these reported failures contributed to any injuries of cabin occupants. However, the Safety Board recommends that:

2. Locking mechanisms be inspected and either be replaced with locks of a new design or the defective lock mechanisms be returned to serviceable condition by rework or repair.

3. The FAA correct any crashworthiness deficiencies in Boeing 747 overhead storage bins by establishing a deadline date for compliance with any modification requirements.

Economy Seat Headrest Separation: During this accident, several seat headrests were reported to have been thrown from their seat units. Examination of like headrests in another PAA 747 revealed that all such units tested were easily removed by hand without deactivating the lock mechanism. It is not known if these reported failures contributed to injuries, but the Safety Board recommends that:

4. FAA examine these seats with a view toward improving the crashworthiness of seats/headrests and establishing a deadline date for compliance with any modification requirements.

Narrow Aisle Stretchers: Following the abort of the flight and the landing, difficulty was encountered in removing from the aisle passengers suspected of having back injuries. This was because the aisle widths were too narrow for standard stretchers, resulting in great difficulty transferring patients from lying positions in the aisle to stretchers. The Safety Board recommends that:

5. The FAA advise medical facilities serving airports to stock narrow "carrying boards" or narrow stretchers that can be easily used in the space of an air carrier passenger compartment aisle to facilitate removal of non-ambulatory patients.

Air Carrier Policy on Deviation of Flight: Following this encounter with turbulence, the flight service director went forward to the cockpit and advised the captain that several passengers were severely injured or ill. The captain requested the service director to return to the passenger compartment and to reassess the situation. After reassessing the cabin injuries, the attendant reported to the captain a second time that several persons appeared to be severely injured. Ten to fifteen minutes elapsed between the initial report of passenger injuries and the captain's decision to divert the flight and return to his destination. The aircraft was met by the chief physician at John F. Kennedy International Airport. The Safety Board recommends that:

6. The FAA review and, where appropriate, amend air carrier policy concerning in-flight assessments of injury or illness of passengers in order to preclude unnecessary delays in securing necessary medical assistance.

Members of the Safety Board staff would be pleased to discuss these recommendations with your staff should you feel further clarification is required.

These recommendations will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.

Reed, Chairman; Laurel, McAdams, Thayer and Burgess, Members, concurred in the above recommendations.

/s/

By: John H. Reed
Chairman

WASHINGTON, D.C. 20590

OFFICE OF
THE ADMINISTRATOR

7 May 1971

Honorable John H. Reed
Chairman, National Transportation Safety Board
Department of Transportation
Washington, D. C. 20590

Dear Mr. Chairman:

This is in reply to your communication issued 28 April 1971 containing safety recommendations A-71-25 thru 30 resulting from a B-747 turbulence encounter in which passengers were injured. We have carefully reviewed these recommendations and their rationale and have the following comments to offer.

Seatbelt Discipline

FAR 121.317(b) requires that ". . . . . each passenger shall fasten his seat belt and keep it fastened while the seat belt sign is lighted." It is apparent that some passengers do not abide by this rule especially when the seat belt sign is left lighted for protracted periods. We will issue an operations bulletin to all of our inspectors having certificate responsibility for air carriers and their training programs, emphasizing the importance of oral announcements and better surveillance to assure compliance with seat belt fastened commands and security. FAR 121.317(a) requires that seat belt signs be visible to all passengers.

747 Overhead Bin Failures

During the B-747 type certification program special attention was given to the adequacy of the latching mechanisms for the new type overhead storage bins. The investigation currently underway has revealed that the stationary latch pins in the bin supporting structure failed, allowing the bins to fall open under flight loads. A corrective retrofit modification has been prepared by Boeing in Service Bulletin number 25-2056. We are studying this matter and assessing the need for mandatory action.

Economy Seat Headrest Separation

The headrests which became separated from seats are parts of the Aerotherm seats installed in the coach sections of Pan American's B-747's. We understand the problem is limited to those Pan American coach seats only. A corrective service bulletin is being prepared and retrofit modification parts for 14 airplanes, about 40 percent of the Pan American B-747 fleet, have been delivered. A deadline for accomplishment of the retrofit will be established as soon as details of the retrofit are finalized. No delay is anticipated.

Narrow Aisle Stretchers

We will include this item in our Operations Bulletin and have our inspectors recommend to the operators that narrow stretchers be stocked at each station not only for B-747's, but all aircraft having narrow aisles.

Air Carrier Policy on Deviation of Flight

We will request our inspectors to review current air carrier directives and policies on this subject. Where necessary, directives will be amended, and policies developed to minimize delays in securing medical assistance for injured passengers, as recommended.

Sincerely,

(signed) J. H. Shaffer
Administrator