



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 11, 2010

**In reply refer to:** A-10-121 through -123

The Honorable J. Randolph Babbitt  
Administrator  
Federal Aviation Administration  
Washington, DC 20591

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On March 22, 2009, about 1430 mountain daylight time, a Pilatus PC-12/45, N128CM, was diverting to Bert Mooney Airport (BTM), Butte, Montana, when it descended and impacted the ground near the approach end of runway 33 at BTM. The airplane was owned by Eagle Cap Leasing of Enterprise, Oregon, and was operating as a personal flight under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91. The pilot and the 13 airplane passengers were killed, and the airplane was destroyed by impact forces and a postcrash fire. The flight departed Oroville Municipal Airport, Oroville, California, at 1210 on an instrument flight rules (IFR) flight plan with a destination of Gallatin Field, Bozeman, Montana. Visual meteorological conditions prevailed at the time of the accident.

The airplane was configured with two pilot seats and eight passenger seats. Two of the passenger seats faced aft, and the other six passenger seats faced forward. All of the pilot and passenger seats were equipped with lap and shoulder harness restraints.

Among the 13 passengers were six adults and seven children (ages 1 through 9 years). Because the flight was a single-pilot operation, eight seats in the cabin and one seat in the cockpit were available to the 13 passengers. Thus, the number of passengers exceeded the number of available seats. Except for the pilot and the occupant of the right front seat, the National Transportation Safety Board (NTSB) was unable to determine the original seating position for the occupants, but the bodies of four children, ages 3 to 9 years, were found farthest from the impact site, indicating that these children were likely thrown from the airplane because they were unrestrained or improperly restrained. The investigation of this accident is ongoing, and evidence indicates that the accident was not survivable. However, the NTSB notes that, if the accident had been less severe and the impact had been survivable, any unrestrained occupants or occupants sharing a single restraint system would have been at a much greater risk of injury or death.

## Safety Belt Regulation History

In August 1971, the Federal Aviation Administration (FAA) amended its safety belt regulations by adding 14 CFR 91.14, “Fastening of Seat Belts,” to its general operating and flight rules to clarify the agency’s position on the use of safety belts. Paragraph (a)(2) of the regulation stated the following:

During the takeoff and landing of U.S. registered civil aircraft ... each person on board that aircraft must occupy a seat or berth with a safety belt properly secured around him [or her]. However, a person who has not reached his [or her] second birthday may be held by an adult who is occupying a seat or berth.

The preamble to the rulemaking specified, “it is not intended that separate seats nor separate safety belts be required for operations conducted under Part 91.”<sup>1</sup> The intent of the regulation<sup>2</sup> was further supported in June 1990 when the FAA issued legal interpretation 1990-14, which stated the following:

As long as approved safety belts are carried aboard the aircraft for all occupants, and the structural strength requirements for the seats are not exceeded, the seating of two persons whose combined weights does not exceed 170 pounds under one safety belt where the belt can be properly secured around both persons would not be a violation of the regulations for an operation under Part 91.

In August 1990, the FAA revised Part 91, and Section 91.14 was redesignated as 14 CFR 91.107, “Use of Safety Belts, Shoulder Harnesses, and Child Restraint Systems.” Section 91.107(a)(3) stated that each person on board a U.S.-registered civil aircraft “must occupy an approved seat or berth with a safety belt and, if installed, shoulder harness, properly secured about him or her during movement on the surface, takeoff, and landing.”

After the BTM accident, the NTSB asked the FAA for clarification about the intent of 14 CFR 91.107 with regard to occupant seats and occupant restraints. In January 2010 correspondence to the NTSB, the FAA stated that, according to Section 91.107, multiple (two or more) occupants are allowed to share one seat and one restraint system as long as “the seat usage conformed with the limitations contained in the approved portion of the Airplane Flight Manual [AFM]” and “the belt was approved and rated for such use.”

In addition, 14 CFR 91.107(a)(3)(i) continued to permit the practice of allowing a child less than 2 years of age to be held on the lap of an adult, and paragraph (a)(3)(iii) included provisions permitting approved child restraint systems aboard aircraft.<sup>3</sup> In October 1992, the

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<sup>1</sup> 36 *Federal Register* 127 (July 1, 1971).

<sup>2</sup> In December 1985, 14 CFR 91.14(a)(2) became paragraph (a)(3), which also included the following reference to shoulder harnesses: “each person on board [a U.S.-registered civil] aircraft must occupy a seat or berth with a safety belt and shoulder harness, if installed, properly secured about him [or her].”

<sup>3</sup> Paragraph (a)(3)(i) states that a person who has not reached his or her second birthday may “be held by an adult who is occupying an approved seat or berth, provided that the person being held ... does not occupy or use any restraining device.” Paragraph (a)(3)(iii) states that a person may “occupy an approved child restraint system.”

FAA revised 14 CFR 91.107(a)(3)(iii) to broaden the categories of child restraint systems that were allowed to be used on aircraft. In the preamble to the rulemaking, the FAA stated, “using these restraints in an aircraft will provide a level of safety greater than that which would be provided if the young children were held in the arms of adults or if safety belts alone were used.”<sup>4</sup>

### **Protection for Part 91 Airplane Occupants**

In June 1996, the Federal Office of Civil Aviation of Switzerland issued the original type certificate for the PC-12/45,<sup>5</sup> and the FAA validated the certification in July 1996. The FAA’s type certificate data sheet for the PC-12 showed that the airplane’s certification basis included the requirements of 14 CFR Part 23, “Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes.”<sup>6</sup> In accordance with Section 23.1583, “Operating Limitations,” paragraph (j), “Maximum Passenger Seating Configuration,” the Pilatus PC-12 AFM included a limitation on the number of seats aboard the airplane. However, the AFM also included a limitation on the number of occupants that could be transported by the PC-12, which is not an operating limitation required under Section 23.1583. Specifically, the AFM stated that, for a corporate commuter configuration, “a maximum of 9 seats may be installed in the cabin in addition to the 2 crew seats” and the “maximum number of occupants is 9 passengers plus pilot(s).”

Pilatus stated that it included the additional, and more restrictive, occupant limitation because of the certification requirements in 14 CFR 23.562, “Emergency Landing Dynamic Conditions.”<sup>7</sup> According to paragraph (a)(1) of the regulation, each seat and restraint system for use in the airplane must be designed to protect each occupant during an emergency landing when “proper use is made of seats, safety belts, and shoulder harnesses provided for in the design.” Section 23.562 also addresses dynamic testing with an anthropomorphic test dummy (ATD) and requires, among other things, that the shoulder harness remain on the ATD’s shoulder and the safety belt remain on the ATD’s pelvis during the impact. However, neither of these conditions could be met with multiple occupants sharing a single seat and restraint system, as allowed by 14 CFR 91.107.

The NTSB is concerned that, if the FAA were to continue allowing multiple occupants aboard airplanes operating under Part 91 to share a single seat position<sup>8</sup> and a single restraint system, then those occupants would not benefit from the improved protection provided by the

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<sup>4</sup> 57 *Federal Register* 42664 (September 15, 1992).

<sup>5</sup> On June 23, 2006, the European Aviation Safety Agency began oversight of the PC-12/45 on behalf of Switzerland.

<sup>6</sup> Amendment 23-36, which became effective on September 14, 1988, upgraded the standards for cabin safety and occupant protection during emergency landing dynamic conditions for newly type certificated Part 23 airplanes. The amendment also established retroactive requirements for safety belts and shoulder harnesses for airplanes manufactured after December 12, 1986, with nine or fewer passenger seats.

<sup>7</sup> The seats in the cabin were also certified according to the requirements of 14 CFR 23.561, “General Emergency Landing Conditions,” and 23.785, “Seats, Berths, Litters, Safety Belts, and Shoulder Harnesses.”

<sup>8</sup> The NTSB recognizes that some airplanes operating under Part 91 are configured with seats that have more than one seating position. For example, the Bombardier Challenger CL-600 involved in the February 2, 2005, accident in Teterboro, New Jersey, was configured with a divan that had three separate seating positions.

crashworthiness requirements of Part 23. The NTSB recognizes that many airplanes operating under Part 91 were certified before the time that the improved crashworthiness standards were adopted but believes that occupants of those airplanes would also benefit from single-occupant use of seats and restraint systems.

Proper restraint use is one of the most basic and important tenets of crashworthiness and survivability. On August 31, 1993, the NTSB issued Safety Recommendations A-93-106 and -107 as a result of the September 1992 accident involving a Piper PA-30 in Broussard, Louisiana. Among the airplane passengers were two children, ages 4 years and 10 months, who were seated in child restraint systems. The NTSB determined that the children survived the impact (which involved high vertical and side loads) because they were each restrained by a child restraint system rather than an adult-size safety belt. The NTSB's safety recommendation letter also cited two fatal accidents that demonstrated the detriments of having a child sit on an adult's lap with both occupants restrained by the adult safety belt. (In one accident, the child was killed, and the adult survived with serious injuries. In the other accident, neither the adult nor the child survived, even though the occupiable space where they were seated remained relatively intact.) The NTSB stated that the adults involved in these accidents might have erroneously thought that they were providing protection to the children by restraining them within the adult safety belts but that the children's injuries were likely exacerbated by the weight of the adults.<sup>9</sup>

Safety Recommendations A-93-106 and -107 asked the FAA to do the following:<sup>10</sup>

Amend 14 CFR Parts 91, 121, and 135 to prohibit two or more persons from using a safety belt that is designed for one person, regardless of age. (A-93-106)

Begin an education campaign to inform general aviation pilots of the benefits of using child restraint systems, and the danger associated with using a safety belt designed for one occupant to restrain two persons. (A-93-107)

With regard to Safety Recommendation A-93-106, on November 17, 1993, the FAA stated that Parts 121 and 135 do not allow the use of one seatbelt for more than one person if that person is older than 2 years of age. The FAA also stated that airline industry policy prohibits fastening a restraint system around an adult and an infant. Further, the FAA stated that, because Part 91 does not prohibit the use of one safety belt by more than one person, it would issue advisory material discussing the safety hazards of having a child less than 2 years of age fastened within an adult safety belt. On July 12, 1995, the NTSB stated that the combined effect of the

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<sup>9</sup> See <[http://www.nts.gov/Recs/letters/1993/A93\\_106\\_107.pdf](http://www.nts.gov/Recs/letters/1993/A93_106_107.pdf)> at the NTSB's website for more information.

<sup>10</sup> In addition, the NTSB issued companion recommendations to the General Aviation Manufacturers Association (GAMA) and the Aircraft Owners and Pilots Association (AOPA). Safety Recommendation A-93-108 asked GAMA to "encourage its members to include information about the use of child restraint systems on general aviation aircraft in passenger briefing cards, pilot operating handbooks, and approved flight manuals." Safety Recommendation A-93-109 asked AOPA to "inform its membership of the dangers associated with using a seatbelt designed for one occupant to restrain two persons, and the benefits of using FAA-approved child restraint systems on aircraft." Safety Recommendation A-93-108 was classified "Closed—Acceptable Action" on August 27, 1998, and Safety Recommendation A-93-109 was classified "Closed—Unacceptable Action/No Response Received" on January 21, 1998.

regulations and the airline industry policy achieved the intent of the recommendation for Part 121 and 135 operations. The NTSB also stated that the FAA's public education effort in response to Safety Recommendation A-93-107 was a more effective way to address the safety issue associated with Part 91 operations.

On July 30, 1996, the FAA stated that it had revisited its position regarding this recommendation and that it published, on June 4, 1996, a final rule regarding child restraint systems. The FAA indicated that the final rule amended Parts 91, 121, and 135 to prevent an adult and a child from using one seatbelt.<sup>11</sup> On November 26, 1998, the NTSB stated that it continued to believe that all occupants regardless of age should be restrained for takeoff and landing and during turbulence and urged the FAA to require approved restraint systems for all occupants. The NTSB also stated that, because the information in the final rule satisfied the intent of Safety Recommendation A-93-106, the recommendation was classified "Closed—Acceptable Action."

Regarding Safety Recommendation A-93-107, on November 17, 1993, the FAA stated that it agreed with the recommendation and would publish an educational pamphlet to provide the general aviation community with the information regarding the methods used to properly restrain children. On January 3, 1995, the FAA stated that a long-term education program was underway to inform general aviation pilots of the benefits of using child restraint systems. The FAA's efforts included an April 1994 article that discussed the benefits and types of child restraint systems and the requirements of 14 CFR 91.107.<sup>12</sup> The FAA further stated that this information would be featured in its fiscal year 1995 aviation safety program for general aviation pilots and that it would design, produce, and distribute a safety education video on child restraints.

On June 20, 1995, the NTSB stated that the FAA's actions satisfied the intent of the recommendation. As a result, Safety Recommendation A-93-107 was classified "Closed—Acceptable Action."

One of the two fatal accidents cited in the letter transmitting Safety Recommendations A-93-106 and -107 involved a 3-year-old child who, according to 14 CFR 91.14 (a)(2), should have occupied his own seat. The NTSB investigated a more recent Part 91 accident with a similar circumstance. Specifically, on June 3, 2008, a Socata TBM 700 (850) departed from Iowa City, Iowa, when a preexisting tailwind caused the airplane to aerodynamically stall and impact the ground. A child, age 2 years 10 months, was held by her mother during the flight and was unrestrained, which was not in compliance with 14 CFR 91.107(a)(3)(i). The pilot and the child's mother received minor injuries as a result of the accident, but the child was killed. The

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<sup>11</sup> The preamble to the final rule discussed child restraint devices, including belly belts and harnesses, which were prohibited by the rulemaking. The FAA's response to Safety Recommendation A-93-106 indicated that the final rule would prevent an adult and a child from sharing a seatbelt; however, the final rule still allowed multiple occupants to use a single seat and restraint in aircraft operating under Part 91. As previously stated, the FAA's January 2010 correspondence to the NTSB indicated that multiple occupants were allowed to share one seat and one restraint system in aircraft operating under Part 91.

<sup>12</sup> "Don't Forget the Children!" *FAA Aviation News*, April 1994.

NTSB determined that the failure to properly restrain the child passenger contributed to the severity of the child's injuries.<sup>13</sup>

The NTSB continues to believe that Part 91 regulations do not promote effective occupant protection because multiple occupants sharing one seat and restraint system are less likely than single occupants to withstand deceleration forces during a survivable crash. Research conducted in 1993 by the United Kingdom's Civil Aviation Authority (CAA) documented problems with dual occupancy of a seat and restraint system designed for one adult passenger.<sup>14</sup> The CAA's conclusions were based on a series of tests to determine the safety implications of a seating configuration in which two children of similar or different ages occupied an aircraft seat designed for one adult passenger and were restrained under the same lap belt.<sup>15</sup> The CAA found the following:

- Seating two children in the same seat and restraining both under one lap belt provided neither child with the same protection that they would have received if they were in separate seats.
- Seating two children side by side in a seat and restraining both under the same lap belt increased the risk of both children sustaining head injuries during an impact.
- Seating two children side by side in a seat and restraining both under the same lap belt increased the risk of both children sustaining bodily injuries during an impact because of the interaction between their bodies.
- Seating two children side by side in a seat and restraining both under the same lap belt increased the loading on, and the injuries to, the abdomen of one or both children during an impact.
- Placing one child on the lap of another child and restraining both under the same lap belt greatly increased the risk of both children sustaining serious or fatal injuries during an impact.

Title 14 CFR 121.311, "Seats, Safety Belts, and Shoulder Harnesses," and 135.128, "Use of Safety Belts and Child Restraint Systems," require separate seats and restraints for each passenger age 2 years and older. The addition of such a requirement to Part 91 regulations would help ensure the proper use of seating and restraint systems during this type of operation. The NTSB concludes that, for survivable accidents, Part 91 airplane occupants would be afforded better crash protection if each seat and restraint system were limited to only one occupant. Therefore, the NTSB recommends that the FAA amend 14 CFR Part 91 to require separate seats and restraints for every occupant.

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<sup>13</sup> For more information about this accident, see CHI08FA150 at the NTSB's website.

<sup>14</sup> Roger N. Hardy, "Dual Child Occupancy of an Aircraft Seat," CAA Paper 93013 (London, United Kingdom: Civil Aviation Authority, 1993).

<sup>15</sup> Although the CAA's research was conducted using lap belts, the NTSB believes that the CAA's findings would also apply to multiple occupants sharing a restraint system with a shoulder harness because the effectiveness of the shoulder harness would be reduced and the risk of injury to the occupants would thus increase.

In addition, Part 91 regulations allowed the 1-year-old passenger involved in the BTM accident to be held on the lap of an adult. In April 2010 correspondence to the NTSB, the FAA stated that the lap child would not have been included in the Pilatus PC-12 AFM's limitation on the number of occupants because a child who has not reached his or her second birthday is considered to be "part of the adult occupant" rather than a separate occupant.

Guidance on the FAA's website emphasizes that the safest place for a child under 2 years of age during turbulence or an emergency is in an approved child restraint system and not on an adult's lap.<sup>16</sup> Thus, the lack of a child restraint system requirement for children under the age of 2 years could affect the survivability of these occupants in aircraft operating under Part 91. As a result, the NTSB concludes that children less than the age of 2 years who are properly restrained during Part 91 operations would be afforded the best protection in the event of an accident with survivable impact forces. Therefore, the NTSB recommends that the FAA amend 14 CFR Part 91 to require each person who is less than 2 years of age to be restrained in a separate seat position by an appropriate child restraint system during takeoff, landing, and turbulence.

### **Protection for Part 121 and 135 Airplane Occupants**

Although 14 CFR 121.311 and 135.128 require separate seats and restraints for each person, the regulations allow children who have not reached their second birthday to be held on an adult's lap (similar to 14 CFR 91.107). The NTSB has previously noted problems aboard air carrier airplanes that affected the safety and survivability of children who were less than 2 years old and were not properly restrained. For example, on July 19, 1989, United Airlines flight 232 crashed during an attempted emergency landing at Sioux City, Iowa, after the fragmentation and separation of an engine fan disk. Of the 296 airplane occupants, 111 were killed, 47 received serious injuries, 125 received minor injuries, and 13 were not injured. Four children, ages 11 to 26 months,<sup>17</sup> were aboard the airplane and were being held by adults. A 23-month-old child was killed, and the other three children received minor injuries.<sup>18</sup> The parents of the four lap-held children were instructed to place their children on the cabin floor and hold them in that position while the adults assumed the protective brace position. After the accident, three of the parents reported that they were unable to hold onto their children during the accident sequence.<sup>19</sup>

As a result of the accident, on May 30, 1990, the NTSB issued Safety Recommendation A-90-78, which asked the FAA to do the following:

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<sup>16</sup> This information was obtained from FAA website <[http://www.faa.gov/passengers/fly\\_children/crs](http://www.faa.gov/passengers/fly_children/crs)> (accessed August 5, 2010).

<sup>17</sup> The NTSB notes that, according to 14 CFR 91.14(a)(2), the 26-month-old child should have occupied his own seat.

<sup>18</sup> For more information, see *United Airlines Flight 232, McDonnell Douglas DC-10-10, Sioux Gateway Airport, Sioux City, Iowa, July 19, 1989*, Aircraft Accident Report NTSB/AAR-90/06 (Washington, DC: National Transportation Safety Board, 1990).

<sup>19</sup> The mother of the 11-month-old child stated that she had problems placing and keeping her child on the floor because the child was screaming and trying to stand up. The mother was unable to hold onto her child and was unable to find her after the airplane impacted the ground. The child was rescued by a passenger who heard her cries and reentered the fuselage before it was consumed by fire. The NTSB was not able to determine what happened to the 26-month-old child during the impact sequence, but he was among the children who survived the impact.

Revise 14 CFR 91, 121 and 135 to require that all occupants be restrained during takeoff, landing, and turbulent conditions, and that all infants and small children below the weight of 40 pounds and under the height of 40 inches be restrained in an approved child restraint system appropriate to their height and weight.

On November 5, 1992, the FAA stated that it did not agree with this recommendation but instead issued a final rule to require that Part 91, 121, and 135 operators accept all approved child restraint systems. On March 15, 1993, the NTSB stated that the final rule was an unacceptable response to this recommendation because it did not require the use of approved child restraint systems.<sup>20</sup>

On May 16, 1995, the NTSB stated that, because the FAA had not taken steps to require that all occupants be restrained, Safety Recommendation A-90-78 was classified “Closed—Unacceptable Action/Superseded.” The recommendation was superseded by A-95-51, which was issued as a result of the July 1994 accident involving USAir flight 1016 in Charlotte, North Carolina. The flight crew decided to continue an approach into severe convective activity and was executing a missed approach when the airplane collided with trees and a private residence near the airport. Of the 57 airplane occupants, 37 were killed, 16 received serious injuries, and 4 received minor injuries. Among those occupants who were killed was a 9-month-old child who was held by her mother on her lap.<sup>21</sup> The child’s mother survived the accident but was unable to hold onto her child during the impact sequence, and the child struck several seats. The NTSB believed that the child might not have sustained fatal injuries if she had been properly restrained in a child restraint system.<sup>22</sup>

Safety Recommendation A-95-51 asked the FAA to do the following:

Revise 14 Code of Federal Regulations Parts 91, 135, and 121 to require that all occupants be restrained during takeoff, landing, and turbulent conditions, and that all infants and small children be restrained in a manner appropriate to their size.

On October 20, 2005, the FAA stated that it fully supported the use of approved child restraint systems in aircraft and had launched a public education campaign to raise awareness about the importance of using child restraint systems. However, the FAA also stated that

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<sup>20</sup> In this response letter, the NTSB cited a January 1993 nonfatal accident that resulted when the airplane, which was operated under Part 121, encountered turbulence over southern Florida. Two lap-held infants aboard the airplane were tossed about the cabin during the encounter. The NTSB notes that, in 1996, the FAA issued a brochure, titled “Childproof Your Flight,” which discussed turbulence and provided the following warning: “The Federal Aviation Administration (FAA) strongly urges you to secure your child in an appropriate restraint based on weight and size. Turbulence can happen with little or no warning. And when it does, the safest place for your child is in a CRS [child restraint system], not in an adult’s lap. Your arms just aren’t capable of holding your child securely, especially when turbulence is unexpected. Keeping your child in a CRS for the duration of the flight is the smart and right thing to do so that everyone in your family arrives safely at your destination.”

<sup>21</sup> An 18-month-old passenger was also held by her mother aboard the airplane. The mother received minor injuries as a result of the crash, but the child received serious injuries (a broken leg).

<sup>22</sup> For more information, see *Flight Into Terrain During Missed Approach, USAir Flight 1016, DC-9-31, N954VJ, Charlotte/Douglas International Airport, Charlotte, North Carolina, July 2, 1994*, Aircraft Accident Report NTSB/AAR-95/03 (Washington, DC: National Transportation Safety Board, 1995).

requiring the use of a child restraint system would significantly raise the net price of travel for families with a child less than 2 years of age because the families would need to purchase a ticket for the child. The FAA concluded that this price increase would divert some family travel from the air transportation system to the highway system, which would, in turn, result in a net increase in overall transportation fatalities.

On March 29, 2006, the NTSB expressed its disagreement with the FAA regarding its diversion argument, indicating that diversion does not have as simple and inevitable an effect as the FAA maintained. The NTSB also stated that, in August 2004, it issued an analysis of the safety consequences of diversions during the previous 25 years that were caused by circumstances other than a child restraint system requirement and that the analysis provided further evidence refuting the simplicity and inevitability of diversion.<sup>23</sup>

The NTSB's analysis of the FAA's diversion argument concluded that, contrary to the arguments that were raised in opposition to a child restraint system requirement,<sup>24</sup> such a requirement would not result in an unreasonable burden on passengers or air carriers. The NTSB disagreed with the FAA's argument that the cost for implementing a child restraint system requirement would not justify the potential benefits because the argument was contrary to all reasonable safety practices. The NTSB stated that results of laboratory data and real-world accident data demonstrated that lap-held children could not be adequately protected during a crash and that considerable analysis of real-world air and road vehicle data found no clearly defined relationship between diversion from air travel and highway accidents or injuries. The NTSB also stated the following:

Passengers are required to securely stow all carry-on baggage during takeoff and landing because of the potential risk of injury to other passengers in the event of an unexpected hazardous encounter. However, passengers are permitted to hold a child of equal size and weight in their lap. When children under 2 years of age are not required to be restrained for their own safety, the safety of their fellow passengers also becomes an issue.

On December 13, 2006, the NTSB noted that, during the almost 12 years since Safety Recommendation A-95-51 was issued, the FAA had consistently disagreed with the NTSB on the appropriate action to take with regard to the recommendation and that neither the FAA nor the NTSB had been able to convince the other of its position.<sup>25</sup> As a result, the NTSB classified the recommendation "Closed—Unacceptable Action" on November 14, 2006. The NTSB continues

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<sup>23</sup> "Analysis of Diversion to Automobiles in Regard to the Disposition of Safety Recommendation A-95-51," National Transportation Safety Board, 2004.

<sup>24</sup> These arguments included the following: (1) a requirement for child restraint system use would take seats from other passengers, (2) air carriers and/or passengers would bear the costs associated with a child restraint system requirement, (3) any increase in airline costs would cause families to divert to other transportation modes or forego travel, (4) increased costs and/or lost revenue would affect the profits of air carriers, and (5) air travelers who divert to other modes of transportation would be exposed to the higher injury and mortality rates associated with those modes.

<sup>25</sup> Child restraints for children under age 2 in airliners appeared on the NTSB's Most Wanted List of Transportation Safety Improvements from May 1999 to September 2006.

to maintain that the FAA's diversion argument is not valid, and the BTM accident renews the NTSB's longstanding concerns about the FAA's lack of restraint requirements for children under the age of 2 years.<sup>26</sup>

Just as the accidents in Sioux City and Charlotte demonstrated the detriments of holding a small child on an adult's lap during an impact sequence, the American Airlines flight 1420 accident in Little Rock, Arkansas, demonstrated the protection that an approved child restraint system can provide when impact forces are survivable. Specifically, on June 1, 1999, the flight 1420 airplane overran the end of a runway during landing at Little Rock National Airport. Of the 145 airplane occupants, 11 were killed, 45 received serious injuries, 65 received minor injuries, and 24 were not injured.<sup>27</sup> One of the passengers with minor injuries was a 25-month-old child who was seated in a child restraint system. The child's mother stated, during a postaccident interview, that it would have been "impossible" for her to have held onto her child during the crash if the child had been seated on her lap.

Although more accidents, fatal accidents, and fatalities occurred with Part 91 operations compared with operations under Parts 121 and 135,<sup>28</sup> it is still possible for an air carrier airplane to encounter turbulence or experience an emergency that would necessitate small children being adequately restrained. The NTSB concludes that children under the age of 2 years should be afforded the same level of protection as all other persons aboard air carrier airplanes. Therefore, the NTSB recommends that the FAA amend 14 CFR Parts 121 and 135 to require each person who is less than 2 years of age to be restrained in a separate seat position by an appropriate child restraint system during takeoff, landing, and turbulence.

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

Amend 14 *Code of Federal Regulations* Part 91 to require separate seats and restraints for every occupant. (A-10-121)

Amend 14 *Code of Federal Regulations* Part 91 to require each person who is less than 2 years of age to be restrained in a separate seat position by an appropriate child restraint system during takeoff, landing, and turbulence. (A-10-122)

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<sup>26</sup> In addition, the NTSB notes that the diversion argument does not apply to Part 91 operations in the same manner that the FAA believes it applies to operations in Parts 121 and 135 because flights operated under Part 91 do not involve the purchasing of tickets.

<sup>27</sup> For more information, see *Runway Overrun During Landing, American Airlines Flight 1420, McDonnell Douglas MD-82, N215AA, Little Rock, Arkansas, June 1, 1999*, Aircraft Accident Report NTSB/AAR-01/02 (Washington, DC: National Transportation Safety Board, 2001).

<sup>28</sup> NTSB preliminary statistics for 2009 showed the following: there were (1) 1,474 accidents involving Part 91 aircraft, 272 of which were fatal, resulting in 474 fatalities; (2) 30 accidents involving Part 121 (scheduled and nonscheduled) aircraft, 2 of which were fatal, resulting in 52 fatalities; and (3) 49 accidents involving Part 135 (scheduled and on demand) aircraft, 2 of which were fatal, resulting in 17 fatalities.

Amend 14 *Code of Federal Regulations* Parts 121 and 135 to require each person who is less than 2 years of age to be restrained in a separate seat position by an appropriate child restraint system during takeoff, landing, and turbulence. (A-10-123)

In response to the recommendations in this letter, please refer to Safety Recommendations A-10-121 through -123. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: [correspondence@ntsb.gov](mailto:correspondence@ntsb.gov). If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN and Members SUMWALT, WEENER, and ROSEKIND concurred with these recommendations. Vice Chairman HART did not concur and filed the attached dissenting statement.

*[Original Signed]*

By: Deborah A.P. Hersman  
Chairman

## **Vice Chairman Christopher A. Hart Dissenting Statement**

I believe that sending a recommendation to the FAA about requiring separate seats and restraints for passengers under 2 is a futile effort because we have made that recommendation before, without success, and we have no reason to believe that this approach will achieve a better result this time.

In filing this dissent, let me note at the outset that it is indisputable as a matter of basic physics that a properly restrained child in an airplane is safer than an unrestrained child, and our goal should be to do whatever we can to help assure that every person in an airplane is restrained, irrespective of age. Given that our previous approach has been unsuccessful, I would like to suggest an alternate approach to reach that goal.

The different approach I would like to suggest relates to the fact that infant car seats have improved tremendously since the FAA first promulgated its regulatory exception that allows passengers under the age of 2 not to be restrained – indeed, car seats for children that age may not even have existed when the exception was first created. Given these car seat improvements, perhaps it is time to revisit whether there is still a scientific basis for an exception for children under 2. Thus, I think we should recommend that the FAA revisit, in light of current infant car seat technology, whether there is a scientific basis for excepting children under age 2 from the restraint requirements . . . and if there is no scientific basis for the exception, then the exception is arbitrary, by definition, and **SHOULD BE RESCINDED**.

One advantage of this approach would be to shift the argument away from the FAA's "diversion" response. Irrespective of whether, as the FAA contends, eliminating the age 2 exception would cause diversion of more traffic to the (less safe) highways, the question still remains as to why the FAA drew the line for the exception at the age of 2. If there is diversion to the highways for not wanting to buy an extra seat for a 1 year old, there is no reason why that same diversion argument would not also apply to 5 year olds or 10 year olds. Given that we will not resolve the diversion debate with this process, we can at least try to shift the debate to finding out why they chose the age of 2 for the exception.

If we decide to pursue this "scientific basis" recommendation, I would also suggest applying the recommendation not only to Parts 121, and 135, but also to Part 91, because there is no difference between those Parts insofar as the physics of restraining children is concerned.