



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** January 7, 2008

**In reply refer to:** A-08-1 and -2

The Honorable Robert A. Sturgell  
Acting Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

The Honorable Carl T. Johnson  
Administrator  
Pipeline and Hazardous Materials Safety  
Administration  
1200 New Jersey Avenue, SE  
East Building, 2nd Floor, PH  
Washington, D.C. 20590

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The safety recommendations in this letter are derived from the National Transportation Safety Board's concerns about the increasing number of incidents documented by the Federal Aviation Administration (FAA) involving overheating and fires initiated by secondary (rechargeable) lithium batteries. In many of these incidents, the rechargeable lithium batteries were used in personal laptop computers or other electronic equipment carried on board by airline passengers. Lithium batteries can be more powerful than other types of batteries and are increasingly being carried on board passenger and cargo aircraft.

On February 7, 2006, a United Parcel Service Company (UPS) cargo aircraft had an in-flight cargo fire and made an emergency landing at Philadelphia International Airport.<sup>1</sup> Although the cause of the in-flight fire could not be determined in the UPS accident, the presence of a significant quantity of electronic equipment in the containers where the fire most likely originated led the Safety Board to closely examine safety issues involving the transportation of rechargeable lithium batteries on commercial aircraft, including batteries in airline passengers' laptop computers and other personal electronic devices.

During the Safety Board's public hearing in July 2006 on the UPS accident, representatives of the FAA and the Consumer Product Safety Commission (CPSC) testified about an increasing number of incidents and recalls due to overheating and ignition of rechargeable lithium batteries, usually in laptop computers and other portable electronic devices. A review of the FAA and CPSC records shows an increasing number of fires initiated by rechargeable lithium batteries. From February 2001 to February 2006, rechargeable lithium batteries were involved in four aviation incidents compared to one incident involving rechargeable lithium batteries in the previous 5-year period. Data from February 2006 to July 2007 showed that the number of

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<sup>1</sup> For more information, see *In-Flight Cargo Fire, United Parcel Service Company Flight 1307, McDonnell Douglas DC-8-71F, N748UP, Philadelphia, Pennsylvania, February 7, 2006*, Aircraft Accident Report NTSB/AAR-07/07 (Washington, DC: NTSB, 2007), which is available on the Safety Board Web site at <http://www.nts.gov/publicctn/2007/AAR0707.pdf>.

incidents (nine) involving rechargeable lithium batteries was nearly double that of the previous 10 years. Additionally, since February 2006, the CPSC has recalled more than 9 million rechargeable batteries in laptop computers and other electronic products. The CPSC recalls have resulted from a variety of problems, including design problems, such as inadequate safety circuitry, the lack of physical protection of the lithium-ion cell or battery, and a lack of quality control measures.

Because of the steadily rising popularity of personal portable electronic devices, such as laptop computers and cell phones, the number of rechargeable lithium batteries shipped individually or in electronic equipment will continue to rise, and the potential for a rechargeable lithium battery causing a fire on an aircraft will increase. Therefore, it is essential that the public and air carrier personnel are aware of the risks of lithium batteries and the recommended guidance and restrictions for carrying these items in their luggage and carry-on items.

The Safety Board notes that the FAA, the Pipeline and Hazardous Materials Administration (PHMSA), and aviation industry groups, such as the Air Line Pilots Association (ALPA), have recognized the need to educate the traveling public and the air carriers about the potential dangers of rechargeable lithium batteries and their appropriate handling procedures. On March 22, 2007, PHMSA issued a safety advisory to inform the traveling public and airline employees about the importance of properly packing and handling batteries and battery-powered devices when they are carried on board aircraft. On the same date, ALPA issued a safety alert to educate its members about the characteristics of a fire involving a portable electronic device. On August 3, 2007, the FAA issued an Information for Operators notice because the FAA was continuing to receive reports of cabin smoke or fire suspected to have originated from batteries or battery-powered devices carried in the passenger cabin. The Information for Operators notice reminded operators to be aware of the risks associated with the use of non-rechargeable and rechargeable lithium batteries and battery-powered devices in the passenger cabin and addressed the availability of guidance for the safe transport of batteries and battery-powered devices on board aircraft.

The Safety Board is also aware that PHMSA has established the SafeTravel Web site, which provides detailed guidance to travelers about safely transporting batteries of all types on board aircraft. In April 2007, the first full month SafeTravel was in operation, more than 57,000 hits on the Web site were recorded. In November 2007, more than 378,600 hits were recorded. The SafeTravel Web site provides links to other agencies and organizations, such as the FAA, the Transportation Security Administration, CPSC recalls, the Portable Rechargeable Battery Association, the National Electrical Manufacturers Association, the Underwriters Laboratory, the Air Transport Association, and ALPA. Likewise, many of these organizations have a link to SafeTravel on their own Web sites. The Board also notes that some major airlines, including American, Northwest, Southwest, Midwest, Delta, and United, have placed links to SafeTravel on their respective Web sites.

The Safety Board acknowledges that PHMSA also has taken other actions to inform the public about the SafeTravel Web site. PHMSA has contacted 100 personal computer and gaming-oriented magazines and provided background materials. PHMSA also has presented the SafeTravel public awareness message to 17 national and local print and electronic news sources based in Washington, D.C., and 55 major print media contacts in the major metropolitan markets

in advance of the holiday travel season. Other PHMSA initiatives include nine magazine drop-in advertisements and 1,000 media kits for distribution to companies in the travel/hospitality, manufacturing, and retail sectors. PHMSA also has urged the Air Transport Association and the International Air Transport Association to include SafeTravel information on correspondence for ticketed passengers and frequent flyers and on printed materials in airline seat pockets.

The Safety Board notes that through the efforts and collaboration of PHMSA, the FAA, and participating companies and industry groups, several positive actions have been initiated since February 2007 to educate and inform the traveling public about rechargeable lithium batteries and their safe transportation. However, the Board is concerned about whether the information and guidance is reaching the majority of the traveling public, including flight crews. Although the initial safety advisories and safety alerts were useful, they provided a one-time notification and likely did not have a lasting impact upon the public. Further, the Board is not assured that such advisories and alerts are the most effective means of informing the traveling public because they reach only those who search the *Federal Register*, Government Web sites, or trade association Web sites.

While the number of hits on the SafeTravel Web site has increased substantially since its introduction in April 2007, the number of hits to the Web site relative to the number of air passengers remains extremely small. The Safety Board is concerned that most air travelers will not seek out a Web site, such as SafeTravel, unless they already have some information about a particular problem. According to the Bureau of Transportation Statistics, the monthly number of passengers carried by U.S. airlines from April 2007 through August 2007 (the most current data available) ranged from a low of 64.7 million passengers (in May) to a high of 72.2 million passengers (in July). Using the highest monthly number of hits to the SafeTravel Web site (378,600 in November 2007), at best only one passenger for every 170 to 190 passengers accessed the SafeTravel Web site. Further, for those passengers that did access the Web site, it cannot be determined if they read and followed the guidance about packing and carrying batteries in their baggage.

The Safety Board recalls the media campaign undertaken by the Transportation Security Administration (TSA) regarding the limitation of liquids in carry-on items. Signs and posters were prevalent in airports, and ticket agents and TSA personnel specifically asked passengers about liquids in their carry-on parcels. Rechargeable lithium batteries may not present a potential security risk like liquid carry-on items, but they do present a potential fire risk on board passenger aircraft. The Board is not aware of a widespread or recurrent media campaign effort being made to educate and inform the air-traveling public about the potential risks of rechargeable lithium batteries. Most air passengers and flight crews are likely unaware of the fire risks posed by rechargeable lithium batteries and the available guidance for their safe carriage on board passenger aircraft. The Safety Board concludes that public awareness initiatives of PHMSA, the FAA, ALPA, and the trade associations for air carriers and manufacturers of rechargeable lithium batteries and/or electronic devices are not reaching significant numbers of air passengers and flight crews and, therefore, are not having the necessary impact to increase awareness about the potential fire risks and safe carriage of rechargeable lithium batteries.

Therefore, the National Transportation Safety Board makes the following recommendations to the Federal Aviation Administration and the Pipeline and Hazardous Materials Safety Administration:

In collaboration with air carriers, manufacturers of lithium batteries and electronic devices, air travel associations, and other appropriate government and private organizations, establish a process to ensure wider, highly visible, and continuous dissemination of guidance and information to the air-traveling public, including flight crews, about the safe carriage of secondary (rechargeable) lithium batteries or electronic devices containing these batteries on board passenger aircraft. (A-08-1)

In collaboration with air carriers, manufacturers of lithium batteries and electronic devices, air travel associations, and other appropriate government and private organizations, establish a process to periodically measure the effectiveness of your efforts to educate the air-traveling public, including flight crews, about the safe carriage of secondary (rechargeable) lithium batteries or electronic devices containing these batteries on board passenger aircraft. (A-08-2)

Please refer to Safety Recommendations A-08-1 and -2 in your reply. If you need additional information, you may call (202) 314-6177.

Chairman ROSENKER, Vice Chairman SUMWALT, and Member CHEALANDER concurred in these recommendations. Members HERSMAN and HIGGINS did not approve. Member HIGGINS filed the following dissenting statement on December 28, 2007, joined by Member HERSMAN.

*[Original Signed]*

By: Mark V. Rosenker  
Chairman

Notation 7772D

**Member Kathryn O’Leary Higgins, Dissenting:**

I support efforts to increase the traveling public’s awareness of the potential fire risks of secondary (rechargeable) lithium batteries and guidance for safe carriage of these batteries on passenger aircraft. I cannot support these recommendations as written because they do not go far enough. I am convinced after reading our report, participating in our discussion in the Board meeting, and presenting several packages for shipment by air in this recent holiday season that these recommendations also need to call for a public awareness campaign on shipment of these hazardous materials for transportation on cargo aircraft.

In the Board meeting, staff noted that incidents involving lithium batteries are underreported, analysis of the risks has not been done and thus risks are not well understood, and current regulatory exemptions permit carriage and shipment of these hazardous materials on both passenger and cargo aircraft without the carrier’s knowledge. These issues led the staff, and the Board, to acknowledge that a serious risk to “all” flight crews is present and “additional measures” should be taken to ensure safe air transportation. Those issues are addressed in recommendations made in the report and here.

My concern at the board meeting and today is the cause of the fire that ultimately destroyed the DC-8 that was UPS flight 1307. Despite hard investigative work, we were not able to determine what might have been shipped that started that fire because so much was destroyed. We can make recommendations to the regulators, manufacturers, and operators, but unless we educate the public about the potential risks and hazards of transporting these hazardous materials on passenger aircraft and shipping them as freight on cargo aircraft, we miss an opportunity to change behavior that may have contributed to the fire on UPS flight 1307.

I believe these recommendations could easily have been revised to cover shipment of packages containing secondary (rechargeable) lithium batteries on cargo aircraft so that guidance to the public broadly covers the risks posed by these hazardous materials. Because I believe that part of the Safety Board’s job is to help educate others about the safety issues we uncover in our investigations, I believe we missed an opportunity to help the public make smarter decisions about shipping packages that contain dangerous materials.