International Civil Aviation Organization

DGP/21-WP/42
11/9/07

**WORKING PAPER**

# DANGEROUS GOODS PANEL (DGP)

## TWENTY-FIRST MEETING

**Montréal, 5 to 16 November 2007**

**Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2009-2010 Edition**

**Agenda Item 5: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel**

**5.4: Review of provisions for dangerous goods relating to lithium batteries**

## ANALYSIS OF "KNOWN OR SUSPECTED" BATTERY INCIDENTS AND UPDATE ON INDUSTRY ACTIVITIES ADDRESSING ISSUES RELATED TO THE TRANSPORT OF LITHIUM BATTERIES

(Presented by the Portable Rechargeable Battery Association)

**SUMMARY**

This paper provides analysis of "known or suspected" battery incidents and an update on industry activities to address issues regarding lithium batteries in transportation.

## 1. INTRODUCTION

1.1 At the 31st session of the UN Subcommittee of Experts on the Transport of Dangerous Goods the expert from the United States submitted INF paper UN/SCETDG/31/INF.41 that contained a list of "known or suspected battery incidents." The list has been cited by the expert from the United States as providing useful clues for considering and establishing corrective actions. The Portable Rechargeable Battery Association (PRBA) has reviewed the list of known or suspected battery incidents and provides the following observations.

1.2 The list from UN/SCETDG/31/INF.41 is attached as Appendix B but it has been amended by PRBA with the addition of a column identified as "**Observations/Comments**." It is important to note that PRBA has identified three "incidents" on the chart that we believe should not be identified as "battery incidents." These include the 11 June 2007 incident involving a Piper-Cherokee plane in Alaska, the 9 March 2007 incident involving a "power converter," and the 11 November 2006 cell phone battery incident that occurred on the desk of a U.S. customs agent in California.

## 2. OBSERVATIONS

2.1 Below are charts that provide a summary of the incidents and their apparent causes. While there appears to be several reasons for these incidents, the majority of the incidents were caused by non-compliance with the current regulations that govern the transport of lithium batteries and equipment powered by them and passengers who failed to protect batteries from damage and short circuits. Therefore, PRBA does not believe significant revisions to the current lithium battery dangerous goods regulations are necessary.

| **Number of Lithium Battery Incidents Since 2000** | Incidents Involving Passengers | Incidents Involving Commercial Shipments |
|---|---|---|
| **23** | 10 | 13 |

| **Cause of 23 Lithium Battery Incidents** | | |
|---|---|---|
| Failure to Comply With Regulations | Design, Recall or Counterfeit | Other |
| 14 | 7 | 2 |

2.2 PRBA and its counterparts in Europe and Asia recognize the concerns of the ICAO DGP and UN Subcommittee of Experts with regard to these incidents and, as more fully explained below, have taken action to address these concerns. However, it is important to recognize that what is missing from this list of incidents is any meaningful "root cause" analysis of the purported incidents. Such analysis is fundamental to determining whether existing regulations address all appropriate issues of concern.

## 3. INDUSTRY ACTIVITIES

3.1 Since the last ICAO working group meeting was held in Memphis, Tennessee, a significant amount of work has been accomplished by members of PRBA, RECHARGE, and Battery Association of Japan (BAJ) that will lead to improvements in lithium cells and batteries and significantly reduce the number of battery incidents even for non-compliant battery shipments. This work includes the following:

a) Revisions to industry lithium battery standards from the International Electrotechnical Commission (IEC), Institute of Electrical and Electronics Engineers (IEEE), and Underwriters Laboratories (UL) that will lead to improved cell and battery reliability.

b) PRBA has developed a brochure on how to safely ship batteries and comply with the regulations that will be made available to members of ICAO DGP and UN Subcommittee of Experts. The brochure is designed to make it easier to understand the various transportation regulations that apply to different battery chemistries. PRBA intends to have the brochure translated to French, Spanish, Chinese, and Japanese and distributed internationally.

c) PRBA has identified and met with trade associations whose members utilize lithium batteries in their products in order to educate them on the requirements of the dangerous goods regulations. For example, PRBA has met with industry trade groups representing the audio/video industries and remote control toy (hobby) industry.

d) PRBA, RECHARGE, and BAJ are hosting an international forum on regulatory issues affecting the rechargeable battery industry that is scheduled for 20 to 21 September 2007 in Washington, DC. The first day of the forum will be devoted to transport issues affecting the rechargeable battery industry. This forum will be attended by representatives of over fifteen battery and electronic industry organizations from around the world.

e) PRBA worked closely with the U.S. Department of Transportation and Transport Canada to develop a new emergency response guide for lithium ion cells and batteries that will be incorporated into the 2008 Emergency Response Guidebook.

f) PRBA recently met with Subcommittee 21A of the IEC and proposed adding information on the lithium battery dangerous goods regulations into the following two IEC battery standards:

1) IEC 62133 — Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable application.

2) IEC 62281 — Safety of primary and secondary lithium cells and batteries during transport.

## 4. RECOMMENDATIONS AND CONCLUSIONS

4.1 PRBA requests assistance from members of the ICAO DGP and UN Subcommittee with disseminating the shipping brochure on how to safely ship batteries.

4.2 PRBA recommends establishing a protocol among Competent Authorities for sharing information on battery incidents in order to better understand the root causes of these incidents.

4.3 In order to simplify the regulations that apply to small lithium cells and batteries and make them easier to understand, Special Provision 188 in the UN Model Regulations and Special Provision A45 in the ICAO Technical Instructions should be reformatted. This reformatting should include removing the packaging requirements in these special provisions and placing them in a new packing instruction. Appendix A contains a proposed reformatted Special Provision A45 and new packing instruction. The proposal is based on changes made to Special Provision 188 of the UN Model Regulations and adopted at the 30th session of the UN Subcommittee of Experts in December 2006.

4.4 PRBA opposes changes such as those advocated by the International Federation of Air Lone Pilots Association that would remove the exemption in SP A45 for small lithium cells and batteries or reclassifying lithium metal cells and batteries from Class 9 to Division 4.3. These proposed changes will only further complicate the dangerous goods regulations and result in more non-compliant shipments.

# APPENDIX A

# PROPOSED AMENDMENT TO THE TECHNICAL INSTRUCTIONS

## Chapter 3

## SPECIAL PROVISIONS

. . .

A45 ~~Lithium c~~Cells and batteries offered for transport are not subject to other provisions of these Instructions if they meet the following:

a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium ion cell, the ~~lithium equivalent content is not more than 1.5 g~~ Watt-hour rating is not more than 20 Wh;

b) For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium ion battery, ~~the aggregate lithium equivalent content is not more than 8 g~~ the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;

c) Each cell or battery is of the type proved to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3; and

d) Packagings meet the requirements of Packing Instruction XXX.

~~d) Cells and batteries are separated so as to prevent short circuits and are packed in strong packagings, except when installed in equipment; and~~

~~e) Except when installed in equipment, each package containing more than 24 lithium cells or 12 lithium batteries must in addition meet the following requirements:~~

~~i) Each package must be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged;~~

~~ii) Each shipment must be accompanied with a document indicating that packages contain lithium batteries and that special procedures should be followed in the event a package is damaged;~~

~~iii) Each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery-to-battery (or cell-to-cell) contact and without release of contents; and~~

~~iv) Except in the case of lithium batteries packed with equipment, packages may not exceed 30 kg gross mass.~~

As used above and elsewhere in the Instructions, “lithium content” means the mass of lithium in the anode of a lithium metal or lithium alloy cell~~, except in the case of a lithium ion cell the “lithium equivalent content” in grams is calculated to be 0.3 times the rated capacity in ampere-hours~~.

. . .

**xxx** **PACKING INSTRUCTION xxx** **xxx**

This packing instruction applies to lithium metal cells and batteries and lithium ion cells and batteries subject to Special Provision A45.

a) Packagings must conform to the provisions of 4.1.1.1, 4.1.1.3, and 4.1.1.9 .

b) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.

c) **Cells and batteries installed in equipment** — Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. The equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use.

d) Except for packages containing no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:

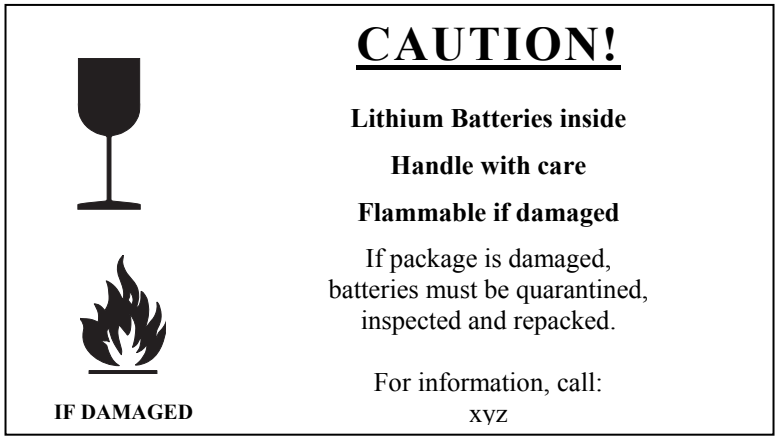
1) an indication that the package contains "lithium metal" or "lithium ion" cells or batteries, as appropriate;

2) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

3) an indication that special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and

4) a telephone number for additional information.

**Example of marking from IEC Standard 62281**



e) Each consignment of one or more packages marked in accordance with paragraph d) shall be accompanied with a document including the following:

   1) an indication that the package contains “lithium metal” or “lithium ion” cells or batteries, as appropriate;

   2) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

   3) an indication that special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and

   4) a telephone number for additional information.

f) Except when lithium batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

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# APPENDIX B

## EXCERPT FROM INFORMATION PAPER UN/SCETDG/31/INF.41

## "Known or Suspected Lithium Battery Incidents"

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 14-June-2007 | Lithium CR123A | Ecoquest "Fresh Air Buddy" personal air purifier | While walking in the Long Beach, CA, airport terminal prior to flight, a passenger's personal air filter worn around her neck exploded in a streak of fire. The battery was ejected at high speed across the terminal and melted the carpet where it came to rest. Passenger was uninjured but suffered scorches/burns on her clothing. *Incident is still under investigation.* | **Product was subject to recall.** Product was equipped with rechargeable lithium ion battery and non-rechargeable lithium metal battery of the same size. When non-rechargeable batteries are inadvertently charged by consumers, they have the potential to create a hazard. |
| ~~11 June 2007~~ | ~~Lithium ion~~ | ~~Notebook computer~~ | ~~On June 11, 2007, a Piper Cherokee (PA-32) plane departed Kake Island Airport, AK (AFE) with two passengers, baggage and mail en route to Juneau, AK (JNU). Shortly after taking off, white-colored smoke began pouring into the cockpit and cabin area from the forward baggage compartment. The smoke forced the pilot to return and make an emergency landing at AFE. The pilot and both passengers exited the aircraft safely, but the aircraft eventually caught fire and was destroyed. The forward compartment contained U.S. Mail and baggage including a laptop computer. The incident is still under investigation by the U.S National Transportation Board and a definitive cause has not yet been determined; however preliminary indications are that the laptop's lithium battery pack is a potential candidate for the start of this fire.~~ | **U.S. National Transportation Safety Board (NTSB) has acknowledged that the laptop computer was not the source of fire. Incident should be removed from list.** |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 5-June-2007 | Lithium ion | Notebook computer | While waiting in the airport gate area, a passenger plugged his laptop computer into an electrical outlet on a column in the seating area. At some point the computer began smoking. Airline agent suggested the passenger unplug or shutoff the computer but passenger did not. The computer eventually burst into flames. Fire extinguishers were used to suppress—but not quickly extinguish—the fire. | No failure analysis was performed on the battery. Battery may have been subject to recall, damaged or a counterfeit.<br><br>Several industry standard organizations (i.e., IEEE, IEC, and UL) have taken steps to amend standards that apply to lithium ion cells, batteries, and notebook computers. |
| 15-May -2007 | Lithium-ion battery pack for Sony PSP | No indication that battery was in or attached to Sony PSP device | Ramp worker removed checked bag that was on fire when loading passenger aircraft. Fire department determined that the fire was caused by a battery-pack for a Sony PSP handheld video game. | **Passenger did not comply with lithium battery carry-on provisions** in Part 8.1.1.2(q) of the ICAO Technical Instructions and failed to properly protect batteries from short circuits.<br><br>PRBA is working with government agencies and industry organizations to develop and distribute information to passengers on the proper care and handling of batteries carried aboard aircraft. |
| 10-May-2007 | Lithium batteries | | A driver smelled smoke in the cargo area of a delivery vehicle. The driver immediately removed the smoking package. The package did not burn or cause other damage. Investigation of the contents showed that the 30 lithium batteries were contained within the package and that some of them had short circuited. The carrier reported that the shipper used a plastic tray to hold the batteries, but that it did not provide sufficient protection against short circuit. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 19-Mar-2007 | "CR123" lithium metal<br><br>*Reportedly; battery fragments were disposed of by crew* | Possibly a camera | 1 ½ hours into a passenger flight from Buenos Aires to Miami a small explosion occurred in the Business Class section of the aircraft. There were sparks then a flash and smoke. Flight attendants, then the Captain, responded. Battery fragments were the only evidence found. It is suspected that the battery dropped into a seat and arced against a metal seat frame causing it to explode. The ruptured battery splattered debris on overhead bins. A fragment hit a passenger in the head burning her hair near her earlobe. Seven flight attendants were affected by smoke/fume inhalation. All refused medical treatment in Miami. One aircraft seat bottom and four seat covers were damaged and replaced. | **There have been a number of recent reports regarding counterfeit CR123 lithium metal batteries.** This incident appears to be the result of a counterfeit battery. PRBA and its members are working with various U.S. government agencies to raise awareness with consumers, government agencies, and battery and electronics trade associations regarding counterfeit batteries. |
| ~~9-Mar-2007~~ | ~~Lithium ion~~ | ~~Laptop computer and power converter.~~ | ~~Passenger flight from Toronto to Dallas/Ft.Worth diverted to St. Louis after strong electrical burning smell in the cabin. Source was laptop being used by a passenger while plugged in to aircraft power port via power converter. Power converter reportedly heated up. Aircraft power port and laptop reportedly in normal working condition afterwards.~~ | This incident is not related to the battery and should be removed from the list. |
| 1-Mar-2007 | Twenty-four Surefire SF123A Lithium metal (non-rechargeable) batteries | | US mail package from EBay internet vendor containing the batteries was transported on a passenger flight from LAX to Sydney and caught fire at the Sydney Mail Gateway Facility. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 10-Feb-2007 | Energizer lithium metal 9-volt, Energizer lithium metal AA, and IDX NP-L50S lithium ion batteries were all present.<br><br>One Energizer lithium metal 9-volt was destroyed in the fire and seems most likely to be source of the fire. | Packed with professional audio/video equipment | While still climbing after takeoff from JFK, smoke began pouring from an overhead bin in the passenger cabin. Passengers alerted the flight attendants who responded. A flight attendant opened the bin and saw thick black smoke and flames in the rear of the bin. As the plane returned to the airport for an emergency landing flight attendants were able to put out the fire, discharging two Halon fire extinguishers. Water was applied to some cloth embers that continued to burn after the Halon was used.<br>Cockpit crew smelled some light smoke in the cockpit and donned O2 masks for approx. 20 seconds until the smoke dissipated.<br>Source of fire, bag with audio-video equip was secured in a lavatory. Aircraft landed and taxied to the gate. One passenger complained of chest pains and needed assistance in exiting the aircraft.<br>The fire apparently was caused by loose batteries that were packed in a bag with other audio-video equipment. | **Passenger failed to comply with lithium battery carry-on provisions** in Part 8.1.1.2(q) of the ICAO Technical Instructions and did not properly protect batteries from short circuits.<br><br>PRBA is working with government agencies and industry organizations to develop and distribute information to passengers on the proper care and handling of batteries carried aboard aircraft.<br><br>PRBA also has met with industry trade organizations representing audio/video rental industry to educate their members on issues associated with batteries in transport. |
| 15-Dec-2006 | One Lithium metal CR123A (probable) | "Fresh Air Buddy" personal air filter | On a Houston-Portland passenger flight, a personal air filter, being worn on a strap around a passenger's neck, started a fire in the cabin. The device started making hissing sounds and then emitted bright sparks/flash and a clap/bang sound. The passenger removed the device and it fell between two seat cushions where it continued to burn and smoke. Passengers dumped water on the device and then flight attendants put out the fire with a Halon fire extinguisher. The aircraft diverted to Colorado Springs. The passenger wearing the device suffered a superficial burn to his chest. Dozens of passengers were examined by EMT personnel, mainly for complaints related to inhalation of smoke and/or Halon fumes. Five or six passengers were taken to the hospital. The two fire-resistant aircraft seat cushions were replaced due to having holes burned in them. | **Product was subject to recall.** Product was equipped with rechargeable lithium ion battery and non-rechargeable lithium metal battery of the same size. When non-rechargeable batteries are inadvertently charged by consumers, they have the potential to create a hazard. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 14-Dec-2006 | Counterfeit CR123A, lithium metal | Flashlight "Superfire WF-501B" | During a UPS cargo flight from Sydney, Australia to Guangzhou, China, at 38,000 ft., the crew heard a loud bang. A crewmember found that his flashlight in a bag next to his seat was warm and had a strong odor coming from it. The flashlight was opened and there was soot/residue from burning. One of the two batteries (now determined to be counterfeit) was damaged. Earlier the crewmember had dropped the flashlight about 6 inches into his bag and heard a thump. | **As previously noted, there have been a number of recent reports pertaining to counterfeit CR123 lithium metal batteries.** This incident appears to be the result of a counterfeit battery. PRBA and its members are working with various U.S. government agencies to raise awareness with consumers, government agencies, and battery and electronics trade associations regarding counterfeit batteries. |
| ~~11-Nov-2006~~ | ~~Lithium ion cell phone batteries~~ | | ~~After being shipped by air from China to the US, some batteries were selected for inspection by US Customs. While on the desk of an import specialist, the battery started emitting sparking flames and smoke.~~ | This "incident" did not occur during transport and it is unclear what occurred prior to the battery being placed on the desk of the import specialist. Therefore, PRBA believes this "incident" should be removed from the list until additional information can be provided. |
| 15-Sep-2006 | Lithium-ion laptop battery | IBM Laptop computer | Approximately 15 minutes prior to departure of a LAX-LHR transatlantic flight, the laptop computer of a passenger began to smoke. The relief pilot and purser assisted the passenger in removing the laptop from the airplane. The laptop was placed on the floor of the gate area where it continued to smoke from the battery pack area and a small flame appeared. A customer service representative discharged a fire extinguisher on the fire. The battery pack continued to smoke for an additional couple minutes with white smoke and a strong odor. The Fire Department responded and discarded the burnt battery pack. The passenger stated the laptop was an IBM that belonged to his company and had been in his possession the entire time, having original parts and never having been serviced. The passenger was reportedly not using aircraft power to operate the computer. The airplane remained in service and departed on time without the incident passenger. | No failure analysis was performed on the battery. Battery may have been subject to recall, damaged or a counterfeit.<br><br>Several industry standard organizations (i.e., IEEE, IEC, and UL) have taken steps to amend standards that apply to lithium ion cells, batteries, and notebook computers that include improved design and testing procedures. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 17-Jul-2006 | EaglePicher -Kokam Lithium ion/polymer (used for remote control models), 122 batteries of various sizes | | The unlabeled/marked package was discovered to have caught fire while being held in bond for customs clearance in Korea. Package had traveled to Korea in FedEx system from Vienna via Paris and Subic Bay. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits, mark outer package, or provide shipping document pursuant to special provision A45.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |
| 02-June-2006 | Lithium ion / polymer, 7.4-volt; 10000 mAh | | An Air China passenger flight from Guangzhou to Chengdu diverted takeoff due to a lithium battery fire in the cargo hold. While taxiing for departure the fire alarm for the lower deck cargo compartment activated. The Captain immediately released the fire extinguisher and the aircraft stopped taxiing. Passengers were evacuated. A burnt package containing lithium polymer batteries was discovered in the cargo hold up against the ceiling of the compartment on top of the other packages. Burn marks were visible on the ceiling. Shipment was declared as electric parts; there was no indication of lithium batteries or Dangerous Goods. No UN test report was available for the batteries. Eleven other boxes were in the shipment. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 15-May-2006 | Lithium-ion<br><br>(VGP-BPL2/VGP-BPS2 or equivalent) | Laptop with spare battery | Shortly before flight departure, a burning smell was detected in the first-class cabin of a Lufthansa ORD-MUC flight.<br><br>Maintenance personnel were called to check and found it was coming from hand luggage inside an overhead luggage bin above seat 2A. The flight attendants evacuated the passengers in first class and first 2 rows of coach class. Crew used extinguishers to prevent setting off what was seen as the beginning of a slow fire. Maintenance immediately brought the bag outside the aircraft onto the ramp where it started to catch fire. Fire dept was called to assist. Fire was eventually put out after reigniting once. Fire apparently started from the extra battery pack for a laptop which was purchased on eBay. Flight departed 1 hour 18 minutes late. | **Passenger failed to comply with lithium battery carry-on provisions** in Part 8.1.1.2(q) of the ICAO Technical Instructions and did not properly protect batteries from short circuits.<br><br>PRBA is working with government agencies and industry organizations to develop and distribute information to passengers on the proper care and handling of batteries carried aboard aircraft. |
| 03-Mar-2006 | Lithium ion button cells, mfr. by Lixing | | US-bound package was noticed to be smoking at outbound FedEx station in Shenzen, China. Upon inspection, the package of lithium ion batteries was discovered to be on fire. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 29-Jun-2005 | Lithium Ion | Battery-pack | At UPS in Ontario, Calif., during unloading of a ULD from Shanghai, it was discovered that a fire had taken place inside the ULD. A package containing a lithium-ion battery pack was identified as the source of the fire. Upon discovery, the burnt package and its contents were cool to the touch and there was no smoldering evident. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits and did not declare it as a dangerous good. (Battery exceeded limitation of Special Provision A45 exception.)<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |
| 11-Feb-2005 | Lithium battery, solid cathode, manufactured by Eagle Picher of Surrey, BC, Canada. | None | An undeclared package containing 18 lithium batteries caught fire while being unloaded from a conveyor belt at the FedEx facility in White Bear Lake, MN. FedEx cargo handlers report hearing a "pop" sound and then seeing the box "lifted" off the conveyor belt by the force. The shipment had flown from Los Angeles to Minneapolis and was to be trucked to Clear Lake, WI. Only one battery caught fire. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |
| 29-Oct-2004 | Ultralife 9-volt lithium (traditional 9-volt form: rectangular with two terminals on top) | Camera equipment | Shortly after departure, the battery exploded in the hand of a cameraman traveling on the VP campaign plane of Sen. Edwards (the cameraman reportedly was in the process of changing batteries). It spewed shrapnel and ignited a fire in the seat which was extinguished by flight attendants and others. The flight crew declared an emergency and returned to Raleigh-Durham airport without further incident. | Batteries do not "spew shrapnel." This incident apparently was caused by an external short circuit when battery came in contact with another metal object. Incident highlights the need to better educate consumers and passengers on the safe handling of batteries, especially while aboard aircraft.<br><br>PRBA is working with government agencies and industry organizations to develop and distribute information to passengers on the proper care and handling of batteries carried aboard aircraft. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 07-Aug-2004 | Lithium-ion | Lithium-ion batteries assembled together in a plastic case | Prototype lithium batteries shipped under a competent authority approval from California to Europe apparently started a fire in a ULD during the loading process at the FedEx Memphis hub. The ULD had just been loaded for a transatlantic flight (Memphis-Paris). The ULD and many other packages in it were damaged/destroyed by fire. Shipment apparently was in violation of the DOT approval allowing the prototype battery to be shipped. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |
| 01-Apr-2004 | CR123 lithium batteries | Flashlight | A flight attendant lent a passenger a flashlight which was recently purchased in Beijing. The passenger dropped the flashlight while it was on. Later the passenger put the flashlight in a seatback pocket. A few minutes later, the flashlight began to emit smoke and noxious fumes. The flashlight became so hot it could only be handled with oven mitts. | **As previously noted, there have been a number of recent reports pertaining to counterfeit CR123 lithium metal batteries.** This incident appears to be the result of a counterfeit battery. PRBA and its members are working with various U.S. government agencies to raise awareness with consumers, government agencies, and battery and electronics trade associations regarding counterfeit batteries. |
| 12-Aug-2002 | Lithium battery (excepted) | Samsung mini computer (palm pilot) | Burning odor detected by handlers at the Los Angeles FedEx inbound package sort center. Battery apparently short-circuited causing the bubble wrap in the package to burn and melt onto the unit. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

| DATE | TYPE OF BATTERY | DEVICE (if applicable) | INCIDENT SUMMARY | OBSERVATIONS/COMMENTS |
|---|---|---|---|---|
| 12-Apr-2002 | Lithium batteries | None | Lithium batteries shipped under exception by Abbott Labs did not have terminals protected from short circuit. Started fire inside package at FedEx Indy sort facility. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |
| 5-Mar-2002 | Lithium batteries | None | A package containing lithium batteries transported in a delivery truck was damaged by other freight. The damaged batteries initiated a fire. | Information is insufficient to determine whether shipper fully complied with the dangerous goods regulations or incident was the result of mishandling by carrier. |
| 03-Nov-2000 | Hawker lithium sulphur dioxide batteries | None | While in route by road to the FedEx Cargo facility in Portland, OR, a lithium battery shorted and ruptured, burning its packaging. The shorted battery had long flexible protruding positive and negative terminals. Two FedEx drivers were treated at a hospital after inhaling fumes from the incident. | **Shipper did not comply with dangerous goods regulations** and failed to pack batteries in such a way to prevent short circuits.<br><br>PRBA, with the assistance of numerous battery and electronic trade associations, has developed materials for distribution internationally that explains the procedures for complying with the regulations including packaging batteries to prevent short circuits. |

— END —