



## **DANGEROUS GOODS PANEL (DGP)**

### **TWENTY-FIRST MEETING**

**Montréal, 5 to 16 November 2007**

**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**

### **IFALPA'S POSITION REGARDING LITHIUM METAL AND LITHIUM ION BATTERIES**

(Presented by M. Rogers)

#### **SUMMARY**

This information paper is intended to clarify IFALPA's position regarding lithium metal and lithium ion batteries, and to support the proposal resulting from the ad hoc working group in Montreal on 4 and 5 October, 2007.

## **1. INTRODUCTION**

1.1 The International Federation of Air Line Pilots Associations (IFALPA), representing in excess of 100 000 pilots at over 90 member associations, supports additional transport requirements for the shipment of both lithium metal and lithium ion batteries aboard aircraft. IFALPA believes that the risks associated with lithium metal batteries as cargo justifies prohibiting their transport aboard aircraft, except in small quantities and when afforded the additional protection of being shipped in or with equipment. IFALPA further believes that lithium ion batteries should be treated as dangerous goods and should be shipped fully regulated.

1.2 IFALPA recognizes, however, that certain exceptions may be necessary to facilitate small shipments while maintaining an acceptable level of safety. While the proposal resulting from the ad hoc working group meeting in Montreal is not fully in alignment with IFALPA's position, we are nevertheless prepared to support the proposal as a minimal step forward. Additionally, IFALPA feels that further delay into the next biennium is not justified, especially considering the number and severity of lithium battery incidents in the air mode.

## **2. LITHIUM ION BATTERIES**

2.1 Lithium ion batteries have the potential to cause fire aboard aircraft when not manufactured, packaged, handled or loaded correctly, or when damaged or exposed to an external fire. Furthermore, at various times even representatives of the battery industry have suggested that training may be required for lithium ion battery shippers, and that a pre-loading visual inspection of the package

may be prudent. Normally, exceptions to the dangerous goods regulations are not provided for substances or articles that require such care in transport.

2.2 There are countless examples of substances and articles that are shipped in small quantities fully regulated. Although they do not have the same history of creating fire aboard aircraft, small cargo shipments of flammable paint, dry ice and life vests are required to be shipped fully regulated, including dangerous goods packaging, labeling and pilot notification. Allowing exceptions for lithium ion batteries while fully regulating cargo shipments of dry ice is not logical within a consistent, risk based regulatory scheme.

2.3 Fully regulating lithium ion batteries as cargo would provide significant safety improvements. A dangerous goods package would decrease the likelihood of short circuits and protect the batteries from damage. A dangerous goods label on the package would be understood by handlers, regardless of the language spoken, and would indicate that the packages must be handled with care and that precautions must be taken if the package is damaged. Training would be required for shippers, improving compliance with the regulations. Operators would inspect packages at acceptance and loading, which would help prevent non-compliance with the regulations and the loading of damaged packages. Pilot Notification would increase awareness of the shipments and improve any necessary emergency response.

2.4 IFALPA recognizes, however, that compliance with these regulations would be difficult for consumers shipping one or two batteries, or for small businesses shipping a small number of batteries. As the relative risk of a package with only several batteries is significantly lower than a cargo shipment of batteries, IFALPA is prepared to support a 5 kg limit on lithium ion batteries shipped under Special Provision A45. A great concern to IFALPA is a large aggregate quantity of excepted lithium ion batteries being loaded together, creating a potential risk without the benefits of dangerous goods packaging, labeling, or pilot notification. By limiting each package to 5 kg, it becomes less likely that such a shipment will be loaded together on a pallet or in a unit load device. As it is impractical to implement a limit for an aggregate quantity of lithium ion batteries in a cargo compartment, preventing large quantities of excepted batteries from being shipped together can only be accomplished by sufficiently limiting the size of the excepted package. A limit of 5 kg relates to approximately 10 lithium ion laptop batteries per excepted package, which would cover the overwhelming majority of cases where consumers or small businesses are shipping a small number of batteries. Once packages contain more than 10 lithium ion laptop batteries, IFALPA strongly feels that full regulation of the shipment is appropriate, especially considering that multiple packages of excepted batteries may be consolidated on the same pallet or in the same unit load device.

2.5 Additionally, IFALPA is unable to justify a higher limit on excepted batteries per package than is allowed on passenger aircraft when the batteries are shipped fully regulated. If a shipper chooses to comply with the packaging, labeling and pilot notification requirements under Class 9 of the dangerous goods regulations, a shipment on a passenger aircraft is limited to 5 kg G per package. IFALPA does not support allowing a larger number of batteries under Special Provision than is allowed in a fully regulated package.

### 3. LITHIUM METAL BATTERIES

3.1 In a working paper submitted by the battery industry, exception is taken to using the United States Federal Aviation Administration (FAA) report entitled "*Flammability Assessment of Bulk-Packed, Nonrechargeable Lithium Primary Batteries in Transport Category Aircraft*" when proposing restrictions on lithium metal batteries aboard aircraft. It should be pointed out, however, that this study was itself prompted by a fire involving lithium metal batteries, which occurred at the Los Angeles

International Airport in 1999. A single pallet of batteries was damaged during unloading, resulting in a fire approximately 3 hours after being damaged. The fire easily spread to an adjoining undamaged pallet of lithium metal batteries, and the fire was extinguished with some difficulty by the Los Angeles fire department.

3.2 The battery industry's objections to referencing the FAA study center on two major points; Packaging would help shield the batteries or delay the onset of the fire, and that the mean temperature of a suppressed cargo fire may be below the auto-ignition temperature of lithium metal batteries. Neither of these two points addresses the characteristics of lithium metal batteries involved in a fire, including the fact that the temperature of the fire is above the melting point of aluminum, that the fire would create a pressure pulse that could cause the pressure relief panels in the cargo compartment to open or the aircraft cargo compartment liner to fail, or that Halon 1301 would have no effect on the fire.

3.3 Furthermore, IFALPA does not agree that an unrelated, suppressible fire is unlikely to ignite a shipment of lithium metal batteries. Aircraft fire detection systems for underfloor cargo compartments rely on particulate detectors located in the ceiling of the compartment, while most cargo on widebody aircraft is containerized or palletized. By the time sufficient smoke exits a unit load device and is detected by the aircraft detection system, it is likely that the temperature in the compartment will have risen far above the auto-ignition temperature of the lithium metal batteries. Additionally, the 400° F temperature cited by the battery industry is a mean temperature for a cargo compartment with a suppressed fire, indicating that a significant number of suppressed fires will be above the mean temperature, likely resulting in auto-ignition of the batteries.

3.4 IFALPA therefore does not support the carriage of lithium metal batteries aboard aircraft, except in small quantities and with the additional protection afforded by having the batteries shipped in or with equipment. At a minimum, IFALPA feels the elimination of special provision A45 for lithium metal batteries on cargo aircraft is justified. At the working group meeting in Beijing, the Panel supported prohibiting lithium metal battery shipments aboard passenger aircraft, while the battery industry suggests limiting the quantity of batteries to 2.5 kg G and requiring metal inner packagings. If such actions are necessary to protect passenger aircraft, IFALPA feels strongly that a Special Provision allowing exceptions to packaging, labeling, and pilot notification requirements when shipped aboard cargo aircraft is not justified.

#### 4. CONCLUSION

4.1 While not fully in line with the IFALPA position, IFALPA supports the proposal developed at the October ad hoc working group meeting in Montreal. The proposal would fully regulate lithium ion batteries, except when shipped in quantities up to 5 kg G per package under Special Provision A45. This would allow single and multiple shipments or batteries (up to about 10 laptop lithium ion batteries per package), while affording the protections of full regulation to larger shipments of lithium ion batteries. The proposal would also eliminate the inconsistency of allowing higher quantities of lithium ion batteries in excepted packages than the 5 kg allowed in fully regulated shipments. It should be noted that passenger provisions, and therefore passengers' ability to bring personal electronic equipment aboard aircraft, would remain unchanged. IFALPA also supports the prohibition of lithium metal batteries on passenger aircraft and the elimination of Special Provision A45 for cargo aircraft, except for button cells when shipped in quantities not exceeding 5 kg G per package.