



香港特別行政區政府
民航處

Civil Aviation Department
The Government of the Hong Kong Special Administrative Region

Dangerous Goods Advisory Circular (DGAC) 4/2007

Safe Handling of Nickel-Metal Hydride (NiMH) Battery Packs 〈鎳氫電池組〉 for Air Transport

(I) Case Sharing

In July 2006, a general air cargo consignment containing NiMH battery packs was transported from Hong Kong to Germany by air and then trucked to the consignee. The battery consignment was in compliance with ICAO Technical Instructions (TI) or IATA Dangerous Goods Regulation (DGR)'s Special Provisions (SP) A123 and was allowed to be transported as general air cargo.

Unexpectedly, at an unknown stage, at least one of the battery packs caught fire which was subsequently discovered upon its arrival at the consignee's warehouse. Though no damage to the aircraft and the truck or injury to personnel had been caused, it has raised this Dangerous Goods (DG) Office's concern on why a SP A123 compliant battery consignment could have caught fire during transport.

(II) Investigation, Findings and Remedial Measures

A detail investigation into the battery fire case had been carried out by this DG Office and the following findings were obtained: -

- (a) Each battery pack concerned was containing 5 individual battery cells and they were inter-connected by metal parts within the outer insulation wrappings (Photo 1);
- (b) Rough handling of the battery packs during loading and unloading had probably damaged the insulation wrappings and the bare casing of individual battery cells were then exposed to each other;
- (c) Further impact or vibration during transport had caused an intermittent "bridging" effect between the casing of individual cells. [Remarks: this is not a short-circuiting effect]; and

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- (d) The “bridging” effect between individual battery cells would have generated electric arcs that were hot enough to ignite the combustible materials inside the battery packs and therefore causing the fire (Photo 2).



Photo 1



Photo 2

Whilst noting the problem and to prevent recurrence, the responsible battery manufacturer had made a lot of effort in improving the battery packs by: -

- (a) thickening the insulation material for individual battery cells;
- (b) insulating the metal connection parts between individual battery cells; and
- (c) improving the plastic bubble packaging etc.

These measures should enable the safe transport of these NiMH battery packs by air.

(III) Recommendations to shippers, freight forwarders and airlines

However, in the experience of the above incident and for the purpose of safe transport of NiMH battery packs as general air cargo, this DG Office recommends the following additional safety measures as well: -

To all NiMH battery manufactures or shippers

- (a) good quality carton or fibreboard box should be used as the outer packaging so as to enable it to withstand the rough handling conditions; and
- (b) appropriate marking or handling labels in suitable languages (e.g. languages of the port of origin and destination) on the outer box should be provided to indicate that it contains NiMH battery packs which requires handling with care.

To freight forwarders and airlines

- (a) confirmation from shippers should be sought if a general battery air cargo consignment is containing NiMH battery packs; and
- (b) if yes, then handle this general air cargo consignment with care apart from checking if the NiMH battery packs are SP A123 compliant.

Should you have any query about this circular, please contact Safety Officers (Dangerous Goods) Mr. Eric CHIM at 2182 1221 or Mr. Alex MOK at 2182 1214.

- END -

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危險品通告第 4/2007 號

安全處理空運鎳氫電池組 (Nickel-Metal Hydride (NiMH) Battery Packs)

(I) 個案分享

二零零六年七月，一批載有鎳氫電池組的普通托運貨物從香港空運往德國，然後由貨車運送給收貨人。托運的電池符合國際民航組織《危險品安全空運技術指令》或《國際航空運輸協會危險品規例》特殊規定第 A123 條，可當作普通空運貨物運送。

在不明時間，至少有一組電池突然着火，運抵收貨人倉庫時才發現。雖然飛機和貨車沒有受損，亦沒有人受傷，但危險品事務組關注到，符合特殊規定第 A123 條的托運電池，為何在運輸途中着火。

(II) 調查、調查結果與補救措施

危險品事務處就電池着火一事進行詳細調查，結果發現：

- (a) 每組電池有五枚電池，外層用絕緣物料包裝，電池之間以金屬零件連接(照片一)；

- (b) 電池組可能被粗暴的裝卸，損壞了外層絕緣包裝物料，令電池外殼外露，可以互相接觸；
- (c) 電池在運輸途中又出現相撞或震動，令電池外殼之間間歇出現“bridging”現象。[註：這並非短路現象]；以及
- (d) 電池之間出現“bridging”現象，所產生的電弧熱力足以點燃電池組內的可燃物料，結果引起火警(照片二)。



照片一



照片二

有關電池製造商注意到這個問題，為免事件重演，採取了下列措施，務求改善電池組的包裝：

- (a) 加厚電池的絕緣物料；
- (b) 令連接電池的金屬零件絕緣；以及
- (c) 改善塑膠氣泡包裝等。

這些措施可確保鎳氫電池組得以安全空運。

(III) 給托運人、貨運代理人 and 航空公司的建議

不過，參考這次事件所得經驗，危險品事務處建議採取下

列額外安全措施，確保鎳氫電池組可當作普通空運貨物安全運送：

給鎳氫電池製造商或托運人的建議

- (a) 貨物外層採用優質紙盒或纖維板盒包裝，以便貨物能抵受粗暴的裝卸情況；以及
- (b) 在外層包裝盒以適當語言（例如來源地和目的地語言）加上恰當標記或處理標籤，註明盒內載有鎳氫電池組，必須小心輕放。

給貨運代理人和航空公司的建議

- (a) 要求托運人證明當作普通空運貨物的電池是否載有鎳氫電池組；以及
- (b) 如證明貨物載有鎳氫電池組，除了檢查鎳氫電池組是否符合特殊規定第 A123 條外，亦要小心輕放有關的普通航空托運貨物。

如對本通告有任何查詢，請聯絡航空安全事務主任（危險物品）詹浩斌先生（電話：2182 1221）或莫斯宏先生（電話：2182 1214）。

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