



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.

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