

# LITHIUM BATTERIES MAY LEAD TO THE NEXT FATAL AIRCRAFT ACCIDENT



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A former UPS ground flight controller who recalled the accident said *“I was working on the night shift, but all of a sudden, I heard a loud explosion from UPS Airlines Flight 6! Boom! At this moment, the pilot urgently requested to return to Dubai International Airport immediately and declared **“Mayday! Mayday!”**”*

The following day, it was reported that on September 3, 2010, a Boeing 747-400F carrying more than 81,000 pieces lithium batteries set out from Dubai to Cologne, Germany. A lithium battery-related explosion occurred on the flight, and two crew members died (GCCA 2010).

The aviation industry immediately came together to set up lithium battery related preventive measures. A similar case occurred on 28 July 2011, Asiana Airlines Flight AAR991 containing a large number of lithium batteries and a considerable quantity of liquids crashed into the Korea Strait and two crew members died in the accident. Another aircraft accident case was reported on 30 May 2017. JetBlue Flight 915 from New York’s John F. Kennedy Airport to San Francisco International Airport was diverted to Grand Rapids due to a lithium battery fire from a passenger’s laptop. Even though preventive measures have been established, accidents will happen. Therefore, are the current measures sufficient for safe air transportation?

Today, most lithium batteries are made in China, and a majority of them are shipped by air globally via Hong Kong. Hong Kong’s re-export cross-border cargo system finds it difficult to identify unsafe batteries or their products in each shipment. Moreover, in many cases, lithium batteries are mis-declared or under-declared. Pinning the responsibility on the parties involved in the shipping process is a major issue.

## Threats posed by lithium batteries and their products

We cannot live without lithium batteries in our daily lives; they are widely used in a variety of devices ranging from mobile phones, laptops, electronic gadgets and professional equipment to motor vehicles. Lithium batteries pose an unseen danger; besides deteriorating the quality of the product, as in many well-known cases such as Samsung Note 7 and hoverboards, they may explode and cause a fire. If the product is over-packed and damaged, it can easily cause a fire within a short period.



Poor quality lithium battery packed with unsafe packaging

## Threats posed by lithium batteries and their products

The shipment of poor-quality lithium battery products is life-threatening and has a significant effect on the global aviation supply chain. The threat begins with the shipping from manufacturers to end users. In Hong Kong, lithium batteries and their products are shipped every day from China and re-exported to international markets, where they are very commonly mis-declared. The risk posed by these products should not be underestimated. They not only harm the economy of Hong Kong and the global electronics industry but also threaten people’s lives.

Therefore, reducing the potential risk of lithium batteries and their products has become a pressing issue for global trade, particularly for maintaining Hong Kong’s status as an international trading port.

## The problem of mis-/under-declaration

To prevent spontaneous combustion, according to the regulations for dangerous goods, a standard package should follow the packaging instructions. Each box should contain a limited net weight of lithium, and batteries with difference voltages or cell types should not be mixed.

With appropriate settings and when operated by a well-trained screening professional, X-ray screening makes it possible to determine whether a lithium battery is packed inside a package. However, it can only tell us whether a lithium battery is present and cannot provide further details such as what the power rating of the lithium battery is or whether the quality of the package is fit for the type of battery inside. Further, certain power rating mis-declared lithium battery products are not detected by X-ray, and in such cases the shipper gets away with not having to pay the high transportation cost required for the transport of high-power batteries that need sophisticated packaging for protection. In fact, mis-declared batteries have recently been commonly found in fire accident cases.

According to the **Hong Kong Dangerous Goods Regulation Chapter 384**, which is based on the international act **“Safe Transport of Dangerous Goods by Air” ICAO annex 18**, shippers and freight forwarders must ensure that all goods are properly classified, packed, marked, labelled and documented before they are offered for air

**China also has the dangerous goods regulation CCAR-276-R1** for air logistics. China has more sophisticated control procedures; for instance, the airlines are required to take responsibility for the battery safety test. However, each province has its own control practices, and this results in more complicated control procedures for cross-province shipment. Therefore, some mainland China shippers tend to ship their goods by land and export internationally via Hong Kong.

Barrister Wilson Lau clarified that in relation to trade-related disputes between a Chinese consignor and a Hong Kong-based carrier/consignee, Article 28 of the Warsaw Convention and Article 33 of the Montreal Convention 1999 state that an action of damages may be brought about in a limited number of jurisdictions in places connected with the carrier.

However, with respect to a forwarder, no clear regulations that can ensure accountability on trade-related disputes between a Chinese customer and a Hong Kong-based forwarder have been formulated thus far. If such a dispute were to arise, the accountability on the Chinese side can only go as far as that specified in the contract between the two parties, which is known to be a convoluted, time-consuming process. In general, there are only three ways to resolve a dispute under these circumstances: **1. arbitration, 2. out-of-court settlement and 3. court proceedings.**

## Difficult to determine accountability

Due to **multi-level consolidation in handling Hong Kong–China cross-border logistic activities**, many parties are involved in the shipping of lithium battery products. Mainland China shippers may use an agent or go through various channels to ship their cargo at the lowest cost. Mis-declaration of lithium batteries shipment is one of the most common ways to make more profit.





Although the problem is complex, it is an integration of legal, technical and business issues. Business interest is undoubtedly a major driver of the whole situation. Therefore, we recommend a platform to solve the problem by collaboration between the stakeholders in the industry.

We propose a programme named the 'Lithium Battery Certification for Air Transportation', abbreviated as LI-CAT. The programme will provide the guidelines for establishing a risk-based management system for both cargo agents and shippers, and will be able to estimate the risk level of each shipment. LI-CAT will automatically rate each shipper and agent, and this information will be shared among approved stakeholders.



The old concept that focuses on 'screening out the bad' has been proven ineffective and inefficient and has resulted in high costs and slowing down of business transactions. In contrast, most of the problems are driven by cost. If the market can distinguish between 'Good', 'Bad' and 'General' [White and Black List] shippers or agents, the cost and the associated risk can be determined. An open platform can be established for the cargo agents to inquire about the classification of the shippers: 'Good', 'Bad' or 'General'. This classification will not only make business transactions convenient but also encourage the shippers or agents to perform better and be listed as 'Good' on the White List. Further, cargo agents will be able take appropriate control measures or reject suspicious or problematic shippers (those on the Black List) and their orders. The LI-CAT programme could push back the accountability to the shipper level, even when the shippers are located in another jurisdiction – China.



As the rating mechanism in the LI-CAT system could be controversial and may lead to conflicts of interest, we suggest that the platform be owned and managed by the industry. The industry shall perform a quality assurance role to ensure that the rating process and mechanisms are appropriate and revised according to the latest trends and business environment.

Based on this 'White and Black List' mechanism, the aviation industry can assess the risk of each shipment, which would allow airlines, cargo agents and shippers to enjoy a more cost-effective and lower-risk supply chain operation.

The platform needs a management system composed of: Management – appoints a dedicated executive to manage the program, and documents the process for security controls, criteria and maintenance of 'White and Black List' Experienced professionals – form a working team knowledgeable on lithium battery and hidden dangerous goods issues, deployment of the quality assurance function, and quality control activities System and Database – record updated data



Shippers' integrity is always critical to the success of the program. Honest and responsible shippers with good dangerous goods knowledge will be classified as 'White'. The following criteria of 'Lithium Battery Known Shipper' suggested by ICAO can be used to rate the shippers:

- Company profile
- Dangerous goods-qualified professionals
- History of declaration accuracy
- Sampling inspection result...etc.

However, if the shipper fails to meet the criteria mentioned above, the shipper will be classified as either 'Unknown' or 'Black', and the cargo agent will assign an experienced staff member to handle shipments by this shipper; tighter inspections (hand search by open box inspection) may be conducted for those on the 'Black List'.

During each shipment, the cargo agent will perform a risk assessment; the result will be recorded in the LI-CAT system. A risk rating will be generated for the corresponding shipment, which will allow airlines and their co-loading agents to estimate the associated risk.

When more agents participate in the programme, more shippers will be rated by this LI-CAT platform and the following results will be obtained:

- **Honest and responsible shippers will want to be listed on the 'White List'**
- **High-risk shippers will be identified easily**

Further, the following concerns are related to the implementation of the 'White and Black List':

**Who is going to host the system?**

What will be the interests of different stakeholders, such as government, agents, shippers and professional organisations

To protect the aviation industry in Hong Kong, we need to implement the LI-CAT system soonest before it is too late.

**About the Authors:**



Dr Jeff Yeung is Director of the Executive MBA (Chinese) Programme, Director of the Institute Development Office in the Asian Institute of Supply Chains and Logistics, and Associate Professor of Practice in Supply Chain Management at the Department of Decision Sciences and Managerial Economics of the CUHK Business School.

Prior to joining the CUHK Business School in 2000, Dr Yeung was a Business Consultant at JD Edwards Hong Kong Limited (now Oracle), a leading provider of supply chain management solutions. He has also been active in consulting and executive training for local and multinational corporations such as FedEx, Pfizer, Hong Kong Post, Fossil, China Telecom, Oriental Logistics and Jusco.

Dr Yeung obtained his BSc degree from the National Cheng Kung University and his MSc in Industrial Engineering from the University of Houston, followed by a PhD in Manufacturing Systems Engineering from the Queensland University of Technology. He has published many articles in reputable international journals including the International Journal of Production Research, International Journal of Production Economics, Journal of Operations Management, Communications of the ACM, International Journal of Physical Distribution & Logistics Management and Total Quality Management. In 2012 he also published a book entitled The Challenges and Opportunities Facing the Hong Kong Logistics Industry.



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Mr. Pang is Founder & President of Supply Chain Security Association (SCSA), also the Hong Kong representative of Transported Asset Protection Association (TAPA). After 25 years field experience, he served over 50 supply chain and logistics projects for both local and multi-national clients. Since Jul 2013, Mr. Pang devoted himself to both associations\* (SCSA & TAPA) for supply chain security & safety development and maintained distance to his consulting business.

Mr. Pang was being invited by World Customs Organization (WCO) to present at 3rd AEO Global Conference in Mexico 2016 and SAFE Working Group meeting in 2018; also he sharing his view of Business Continuity Planning (BCP) in 2015 APEC Meetings in Philippine and Taiwan. Since 2006 Mr. Pang is active in international leading conference and symposium to exchange and learn from various leading supply chain security organizations; such as APEC, IATA, ICAO, Interpol, WCO, TAPA...etc. which providing 1<sup>st</sup> hand information and the direction global concerns and trends, which allow Mr. Pang to share and propose industrial solution for allying with global direction.

Mr. Pang is MBA holder, also certified IATA trainer, and approved by Hong Kong Civil Aviation Department for aviation security and dangerous goods programs; Since 1998, Mr. Pang was guest lecturer for various programs with Chinese University of Hong Kong, City University of Hong Kong, Also Mr. Pang was program advisor for School of Continuing and Professional Education, City University of Hong Kong in 2006 and 2007. Presently, He is honorary advisor for School of Business in Hang Seng Management College.



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