IATA Lithium Battery Workshop

29 – 30 October 2019, Amsterdam, Netherlands

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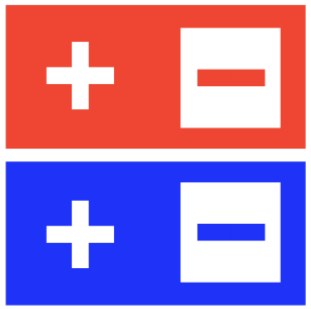

Thank you to all our sponsors!

Day 1 Summary & Chairman Remarks

Geoff Leach

Director

DG Office UK

IATA LITHIUM BATTERY WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

IATA

Shipper's Responsibility
Group Exercise

What is the shipper stating when they sign the Shipper's Declaration

What is enough due diligence for a shipper?

What Are You Signing for?

INSTRUCTIONS:

Each table has a packing instruction. One of:

UN 3480 Section IA, UN 3480 Section IB, UN 3481 Section I PI 966, UN 3481 Section I PI 967, UN 3090 Section IA, UN 3090 Section IB, UN 3091 Section I PI 969, or UN 3091 Section I PI 970.

BE SPECIFIC!!!

Identify all your responsibilities when signing the Shipper's Declaration for your shipment

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.	Name of Signatory Date Signature *(See warning above)*

Breakout: 20 minutes
Present: 5 minutes

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I Hereby Declare That:

1. Any state and operator specific requirements have been complied with
2. Information was provided to staff involved in preparation of shipment
3. Training was provided to staff involved in preparation of shipment
4. All lithium cells and batteries are correctly classified and:
    5. Have passed the UN Tests and Criteria Manual 38.3 tests
    6. Are protected against violent rupture (Section I / IA only)
    7. Are equipped with a means of protection against external short circuit (Section I / IA only)
    8. Are equipped with a means to prevent reverse current flow (Section I / IA only)
    9. Are manufactured under a quality management programme

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I Hereby Declare That:

10. The test summary is available (from 1 January 2020)
11. All Special Provisions have been complied with
12. Packing requirements for the type of packaging have been complied with
13. Only packagings permitted by the Packing Instruction have been used
14. Cells and batteries are in inner packagings that completely enclose them
15. Packaging capable of withstanding the normal conditions of transport
16. Adequate cushioning material have been used

I Hereby Declare That:

17. UN spec packaging meets PG II requirements (Packing Instruction 965, 966, 968, 970)
18. UN spec packaging is being used in the manner intended (i.e. as tested) (Packing Instruction 965, 966, 968 and 969)
19. Packagings (and package) are capable of meeting a 1.2 m drop test (Packing Instruction 965 / 968 Section IB)
20. Outer packagings are strong and rigid (Packing Instruction 965 and 968 Section IB)
21. Lithium metal batteries and cells are packed in non-combustible cushioning material in a rigid metal intermediate or outer packaging (Packing Instruction 969 Section I)

IATA LITHIUM BATTERY WORKSHOP

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I Hereby Declare That:

22. Overpacks / packages do not contain other incompatible dangerous goods
23. Quantity limits have not been exceeded
24. Number of cells or batteries in each package does not exceed the number required for the equipment's operation plus two spare sets of cells or batteries (Packing Instruction 966 and 969)
25. Equipment is protected against inadvertent operation (Packing Instruction 967 and 970)
26. Batteries are protected against short circuit
27. UN spec packagings are marked appropriately

I Hereby Declare That:

28. All required marks are applied and are:
    29. In the correct location
    30. Not obscured
    31. Not reduced in effectiveness by other words
    32. Durable
    33. Able to withstand open weather exposure
    34. Displayed on a contrasting background
35. Only marks and labels of the correct specification have been used
36. Appropriate labels have been affixed

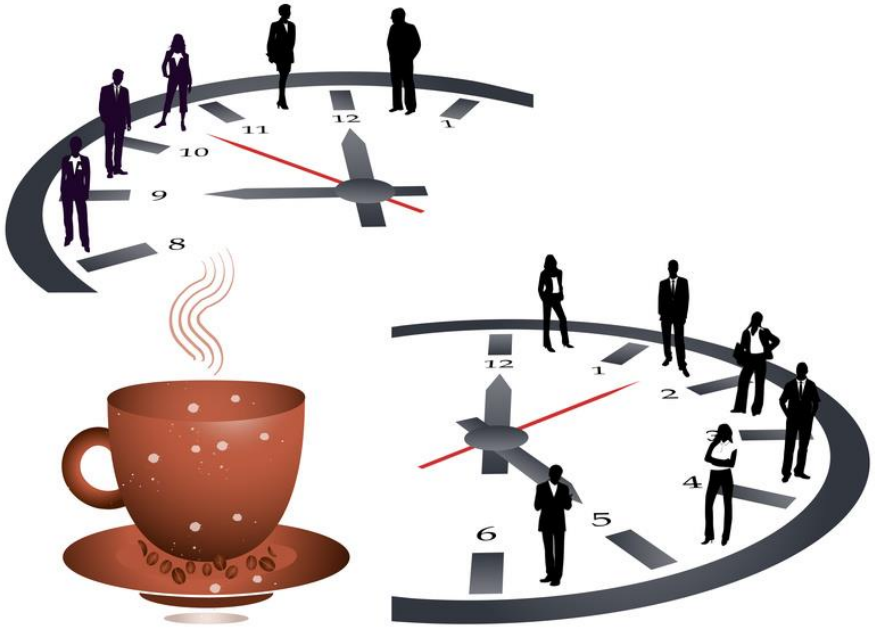
I Hereby Declare That:

37. Irrelevant marks and labels have been removed
38. Overpacks are correctly marked and labelled (if applicable)
39. The transport document (shipper's declaration) has been completed correctly
40. The air waybill contains the required information; and
41. For PI 965, IA and IB that the lithium ion cells or batteries are at no more than 30% SoC.

Networking break 10:30 – 11:00

Kindly sponsored by;

40th Anniversary 1979-2019
VIKING
PACKING SPECIALIST



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LITHIUM
BATTERY
WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

Safety Risk Assessment
A case study on preventative mitigations

Edwin Boon

Safety Compliance Manager

KLM Cargo

IATA LITHIUM BATTERY WORKSHOP

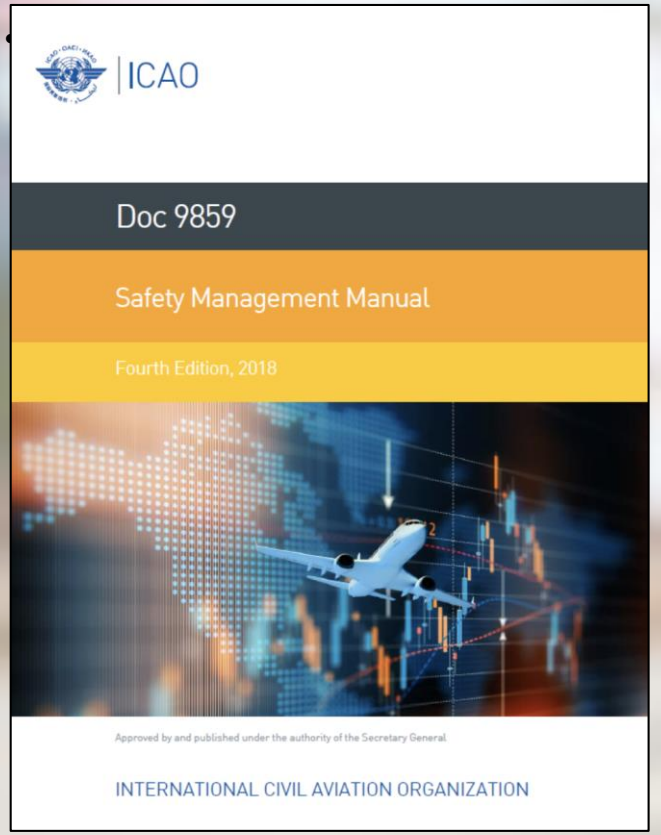
Amsterdam, Netherlands
29-30 October 2019

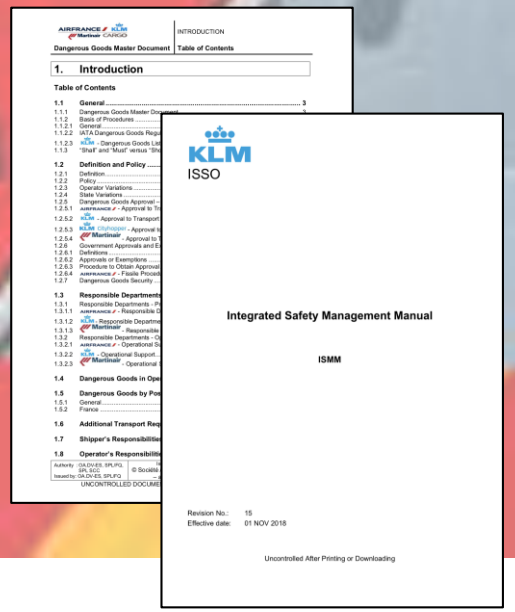
IATA

The 5 Compliance Commitments
Lithium Battery Workshop

Ed Boon
Safety Compliance Manager, KLM Cargo

Risk management in aviation





Operator safety risk assessment

DGP/27 – WP/22

1.5 The work of the FLTOPSCS-SG resulted in the de
Cargo Compartment Safety for Annex 6 as well as associated guidance material proposed for inclusion in a new document (Doc 10102 — *Guidance for Safe Operations of Aeroplane Cargo Compartments*). It is expected that the change to Annex 6 to add Chapter 15 will be adopted by Council later this year with an applicability date of 5 November 2020.

1.6 Paragraph 15.1.1 of Chapter 15 includes the following "The State of the operator shall ensure that the Operator establishes policy and procedures for the transport of items in the cargo compartment which include the conduct of a specific safety risk assessment."

1.7 CONDUCTING SAFETY RISK ASSESSMENTS

Operators engaged in commercial air transport operations should include a safety risk assessment process for the transport of dangerous goods as part of their approved safety management system to comply with Annexes 6 — *Operation of Aircraft* and 19. This safety risk assessment should include appropriate information to result in implementation of safety measures that ensure the safe transport of dangerous goods including lithium batteries and cells as cargo.

ICAO doc. 9284 Ch.1 / 7-1-3

- ICAO Technical Instructions mentions 164 "assessments"
- 3 are "safety risk assessments"
- ALL are about the operator

IATA

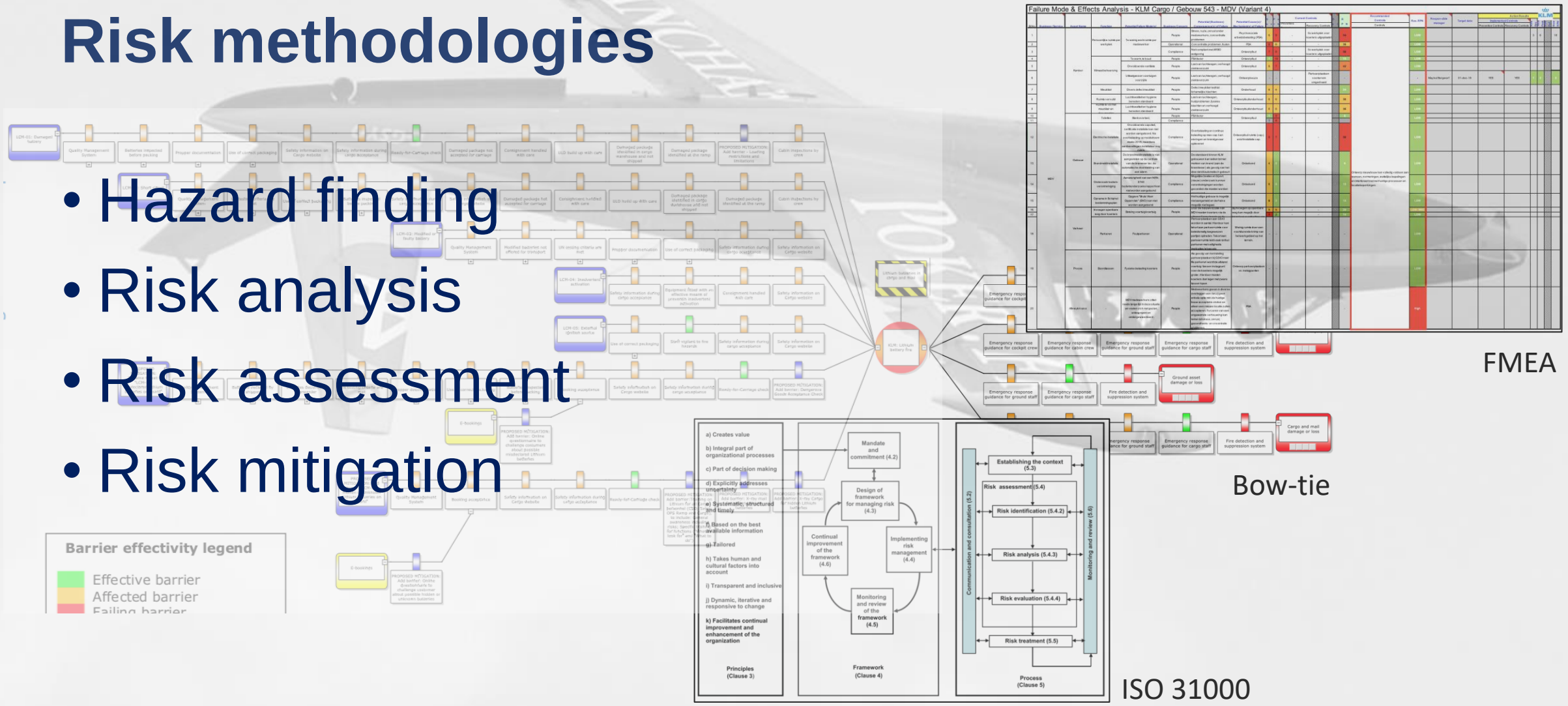
Warsaw Convention 1929 + Montreal Convention 1999

Shipper Responsibilities	Airline Responsibilities
Art. 6: …… to meet the formalities of customs, police and similar public authorities, shall deliver a document indicating the nature of the cargo.	Art. 6. This provision creates for the carrier no duty, obligation or liability resulting therefrom
Art. 10.1: The Shipper is responsible for the correctness of the particulars and statements relating to the cargo, …..	
Art. 16.1: The shipper must furnish such information and such documents as are necessary to meet the formalities of customs, police and any other public authorities before the cargo can be delivered to the consignee.	Art. 16.2 The carrier is under no obligation to enquire into the correctness or sufficiency of such information or documents.

IATA-ACOPS Industry conf. 30oct 2019 – Efficiencies. By KLM

Risk methodologies

- Hazard finding
- Risk analysis
- Risk assessment
- Risk mitigation

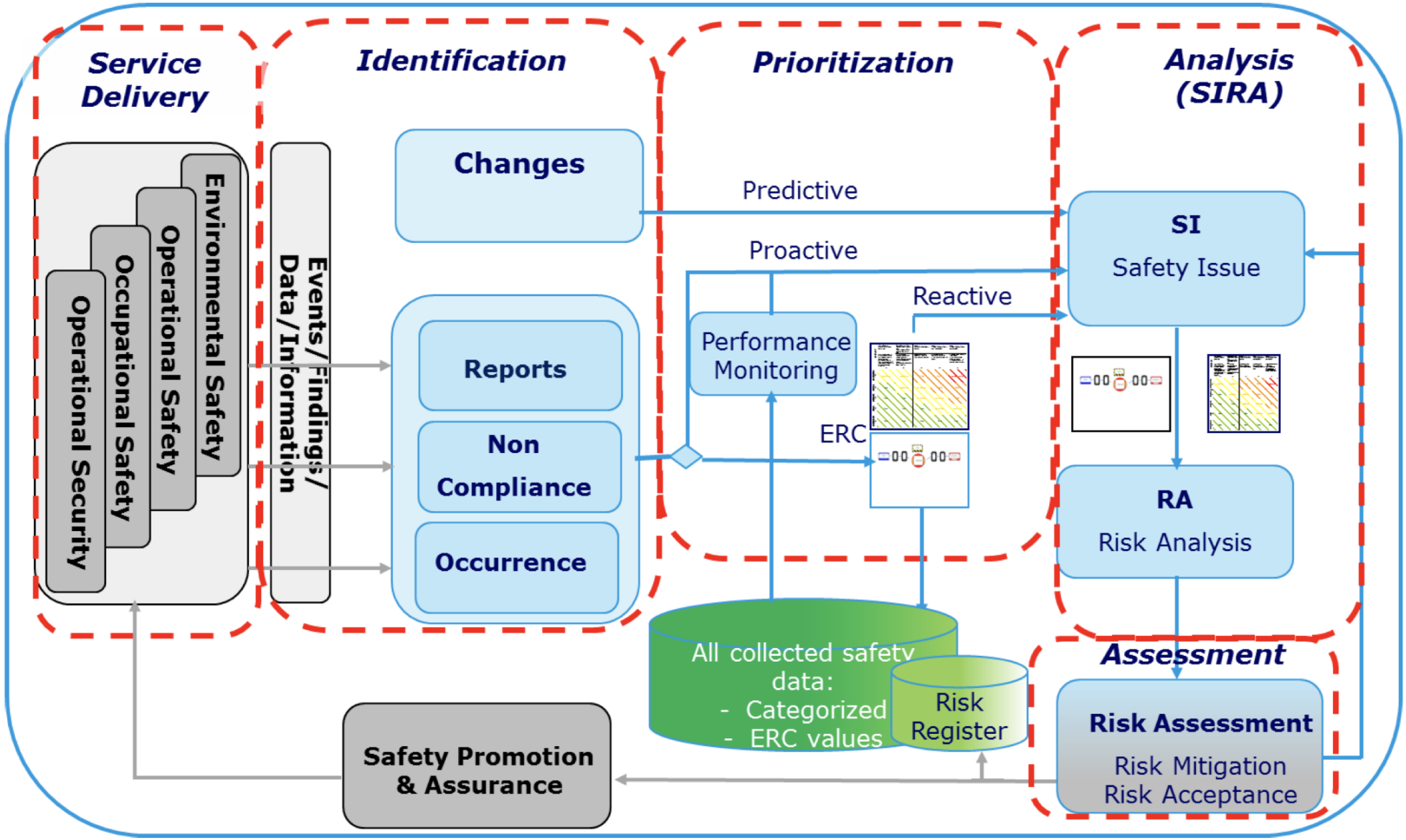


FMEA

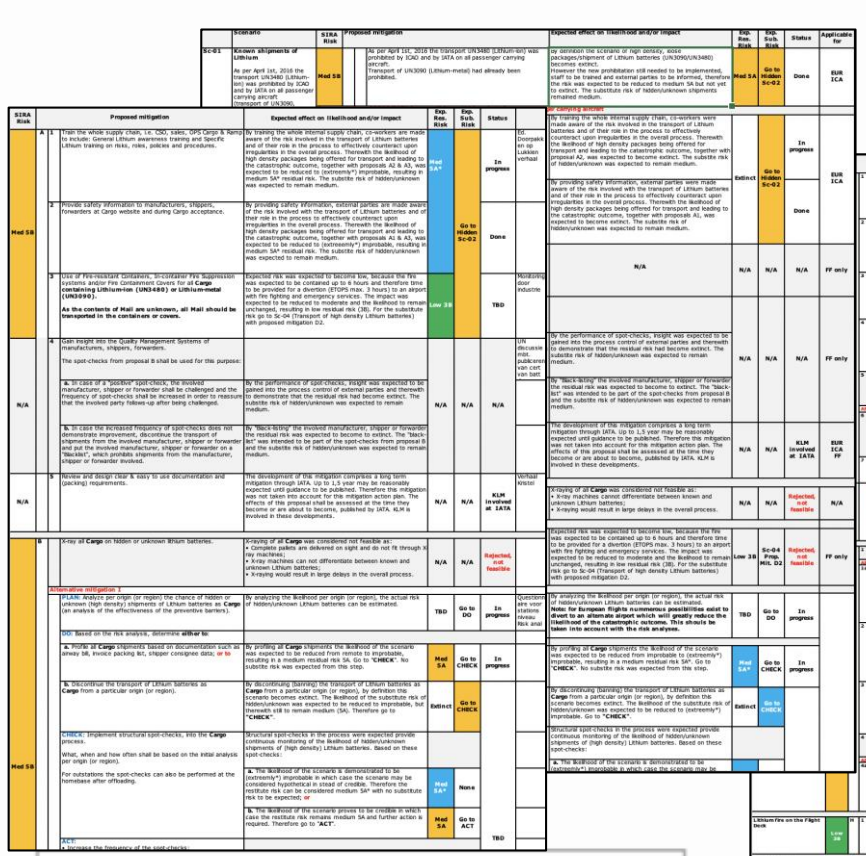
Bow-tie

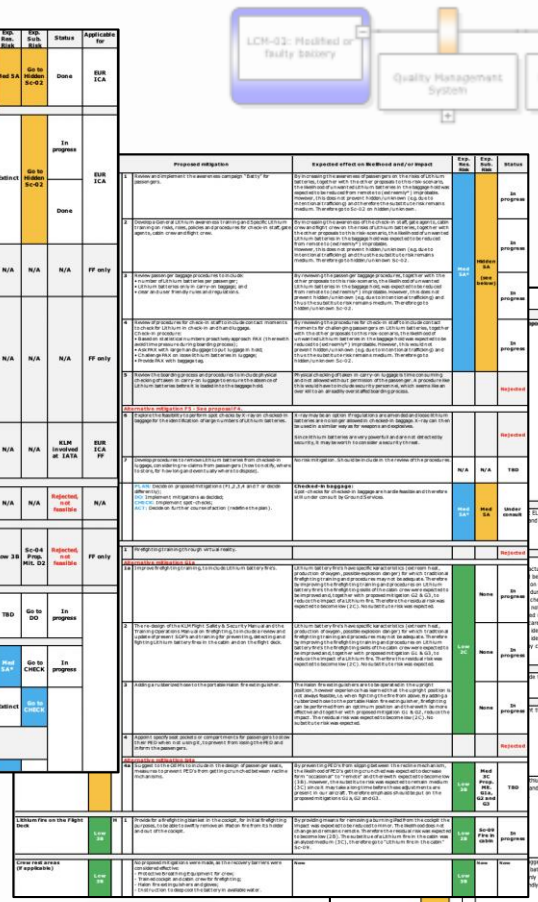
ISO 31000

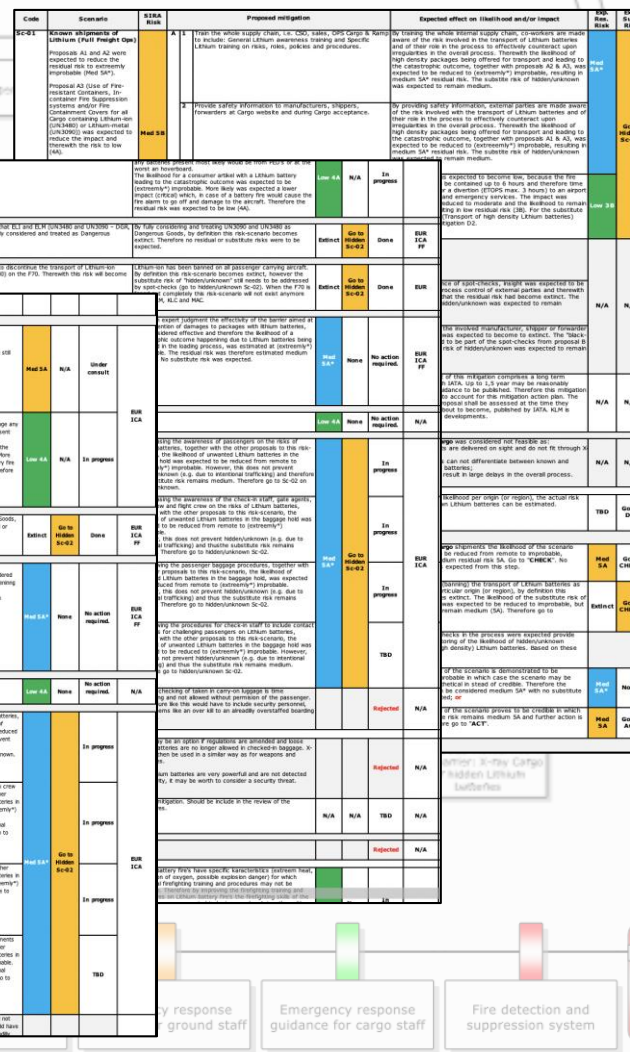
KLM risk analysis scheme

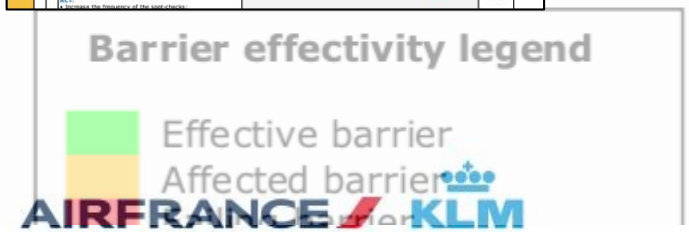


Lithium batteries risk assessment









freight made personal

What keeps you awake at night?

Five compliance commitments:

- We know what we transport
- Catch discrepancies as early as possible
- No! … means NO!
- Prepare for continuous change
- Integrate & innovate

We (need to) know what we transport!

Common hazards:

- Ambiguous shipment commodity descriptions
- e-Commerce
- Mail / Hybrid solutions
- Counterfeit
- Undeclared / misdeclared
- Poor quality manufactured batteries

When we don’t know what we transport !

8506 50

- Cargo appearing as mail
- Intended to become mail after arrival at AWB destination
- UN3481 on the LB mark
- UN3480 inside (unmarked)

Actions: Level 1 inspection

Immediate actions taken:

- Report filed to CAAC
- Auditor on the scene within 48 hours
- Closed station for all freight containing electronics and batteries
- Warehouse inspection and supply chain survey with local KLM staff and GHA staff

Join up with security

(B) Photograph

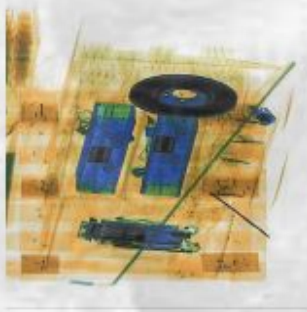
Vertical view

Horizontal view

(C) Photograph

Vertical view

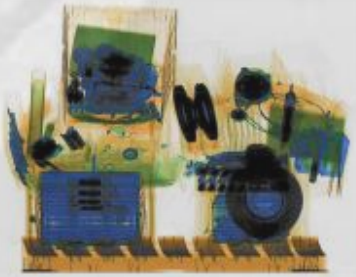
Horizontal view



Top view

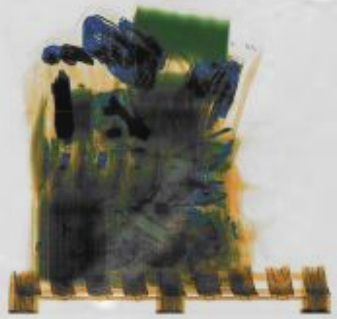
Side view

Top view



Side view

Top View



Side View

Initial intervention

- In concert with security provider started 100% ”piece level screening”
- Security staff operating scanner is also trained on DG
- Additional instruction to look for anomalies and apparent difference in AWB commodity data and scanner image

- 100% piece level screening
- Search for blue images with battery shape appearance
- Scan these images searching for:
  - Loose batteries (no equipment in vicinity)
  - Batteries that appear similar by shape and seem packed together
- Stop suspect shipments
- Open and search packages and intercept:
  - Batteries WITHOUT equipment (UN3480 and UN3090)
  - Loose batteries
  - When possible, check the “state of charge” of batteries without equipment (powerbanks may have a capacity display indicating the state of charge
  - Intercept UN3481 and 3091 >100 Wh capacity, unless they are declared with a Dangerous Goods Declaration
  - Packages containing lithium batteries that have no markings as per IATA DGR

Building a trusted supply chain

Long term strategy on solving the larger problem

- Initiated program to release customers (ic. freight forwarders) based on risk profile
- Full alignment /integration with local security but on forwarder level
- Large amount on shipper built ULD’s causes need to implement at forwarder level
- Specific attention to co-loading
- Additional focus on data!!!

It is a common problem !

8506 50

- Other EU airline warehouse
- Same appearance
- Same destination
- Same shipper

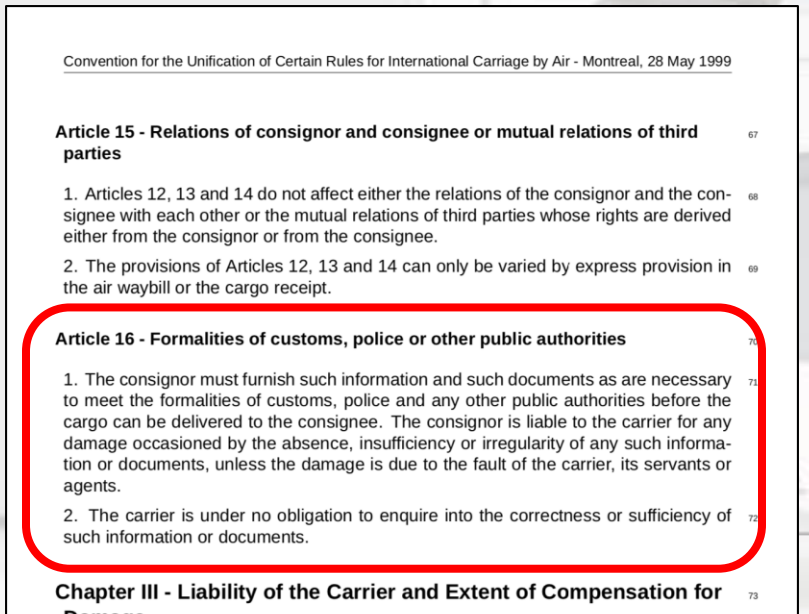
The duty to **investigate**

For this we need; data, data, data . . .

- *eDGD*
- *DG Autocheck*

but also;

- *Shipper / forwarder information*
- *Network and routing information*



Convention for the Unification of Certain Rules for International Carriage by Air - Montreal, 28 May 1999

Article 15 - Relations of consignor and consignee or mutual relations of third parties 67

1. Articles 12, 13 and 14 do not affect either the relations of the consignor and the consignee with each other or the mutual relations of third parties whose rights are derived either from the consignor or from the consignee. 68

2. The provisions of Articles 12, 13 and 14 can only be varied by express provision in the air waybill or the cargo receipt. 69

Article 16 - Formalities of customs, police or other public authorities 70

1. The consignor must furnish such information and such documents as are necessary to meet the formalities of customs, police and any other public authorities before the cargo can be delivered to the consignee. The consignor is liable to the carrier for any damage occasioned by the absence, insufficiency or irregularity of any such information or documents, unless the damage is due to the fault of the carrier, its servants or agents. 71

2. The carrier is under no obligation to enquire into the correctness or sufficiency of such information or documents. 72

Chapter III - Liability of the Carrier and Extent of Compensation for 73

AND

Harmonized Commodity Description and Coding System (HS-codes)

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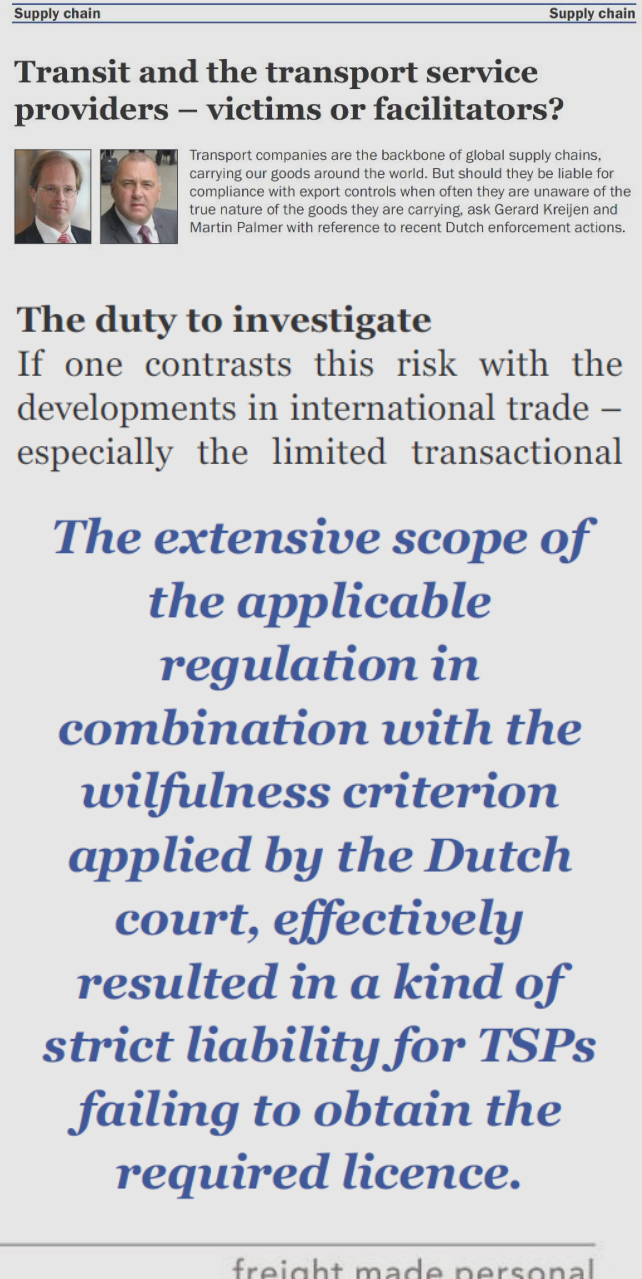


Supply chain Supply chain

Transit and the transport service providers – victims or facilitators?

Transport companies are the backbone of global supply chains, carrying our goods around the world. But should they be liable for compliance with export controls when often they are unaware of the true nature of the goods they are carrying, ask Gerard Kreijen and Martin Palmer with reference to recent Dutch enforcement actions.

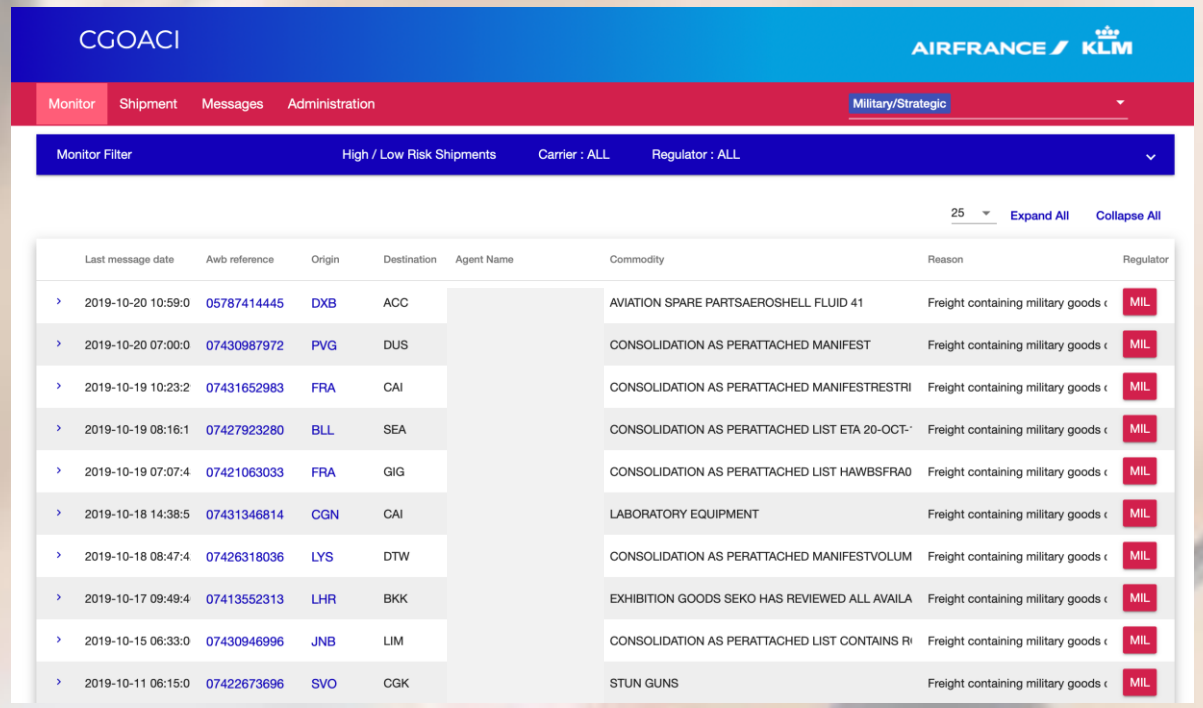
The duty to investigate

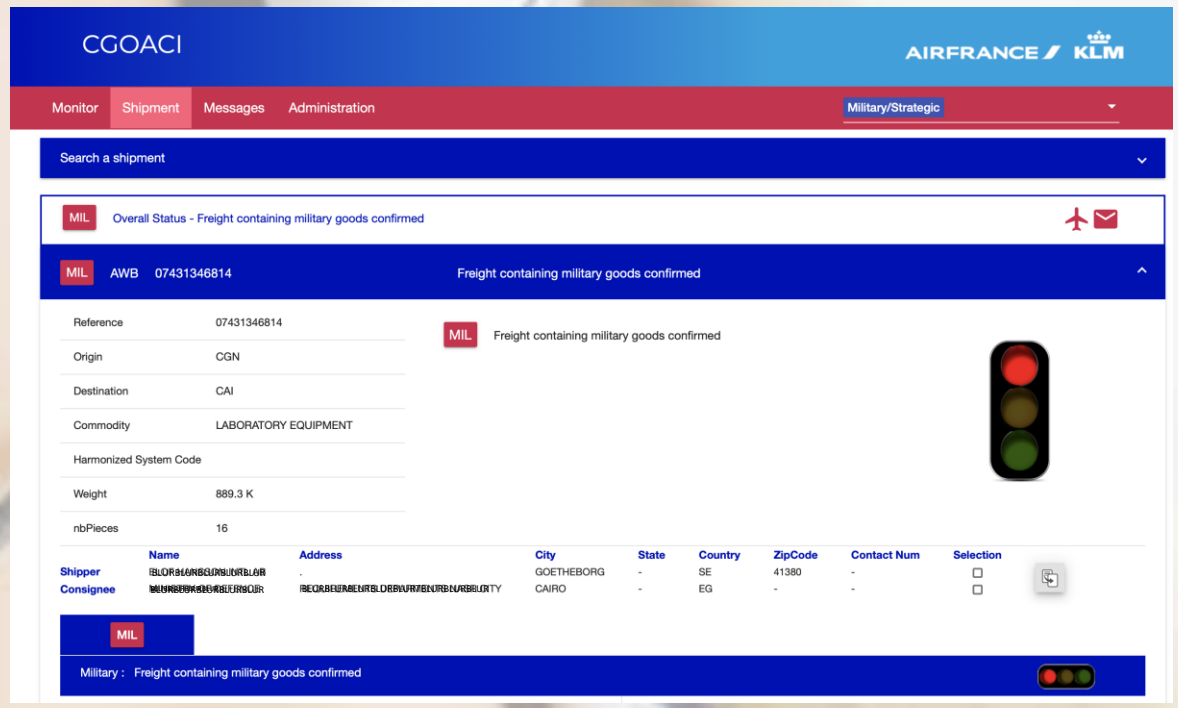
If one contrasts this risk with the developments in international trade – especially the limited transactional

The extensive scope of the applicable regulation in combination with the wilfulness criterion applied by the Dutch court, effectively resulted in a kind of strict liability for TSPs failing to obtain the required licence.

freight made personal

Catch discrepancies as early as possible





No! . . . means NO!

Today's supply chain complexity is huge:

- Embargo
- Complex networks / partners / alliances / interline
- Operator variations
- OK2FWD procedures
- Local restrictions
- Export certificates
- Transit permits
- Etc.

Compliance KEYNOTE

Strategic Goods Awareness

8th July, 2019

WHAT HAPPENED

From 17 to 23 June 2019 the International Paris Air Show took place. During this event all kind of exhibitors displayed their goods. Materials and equipment such as airplanes, fighter jets, (attack) helicopters and (models of) weapons and missiles.

Since several major suppliers of this industry are located in the United States, it's explainable that the abovementioned material and equipment are transported by air – since these goods are in general high value and have to move fast.

Several goods destined for the air show were transported via our AFKL network and were booked via (or with assistance of) our CSO organization without the mandatory licenses and without approval from an AFKL compliance expert.

Fortunately compliance experts recognized and stopped these shipments based on electronical AWB data. The commodities of these shipments were 'missile models' and 'rocket models' from/to military entities. If these shipments had not been stopped, the AFKL organization would have risked lawsuits for transporting military/strategic goods without the necessary licenses.

HOW TO SOLVE THIS

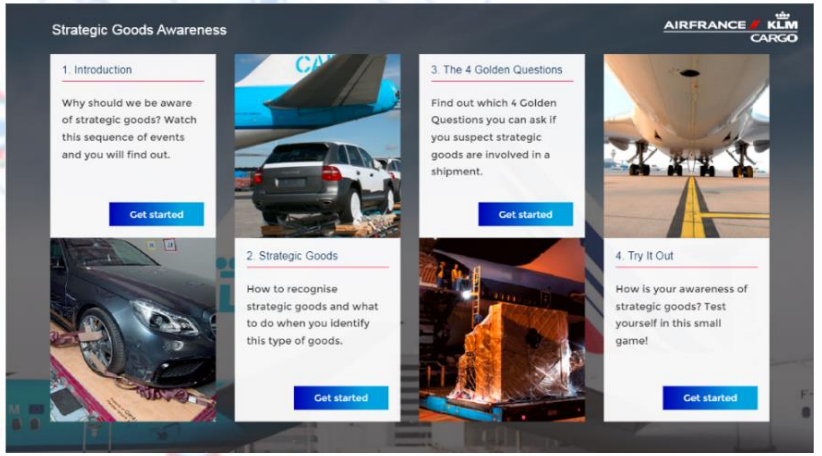
Prior to shipping (possibly) military/strategic goods, an approval from a compliance expert is required (see instruction on MyGuide). You can file a request for an approval via the compliance Approval Tool on the AFKL SharePoint.

Without an approval (OK2FWD) shipments of military items may not be transported within the AFKL network. If such shipments are transported without the necessary licenses and approvals, (local) authorities can file a lawsuit against the AFKL organization. This is of course something we want to avoid at all costs.

The 'Strategic Goods Awareness Training' offered to all commercial staff, emphasized the importance of identifying (possibly) military/strategic goods. During booking you may be triggered by the commodity description (for example weapons or vehicles for warfare) and the shipper/consignee (for example weapon manufacturers or defence/armed forces). As we all know, you should ask yourself the following four questions to verify if the booking contains (possibly) military/strategic goods. The four questions are as followed:

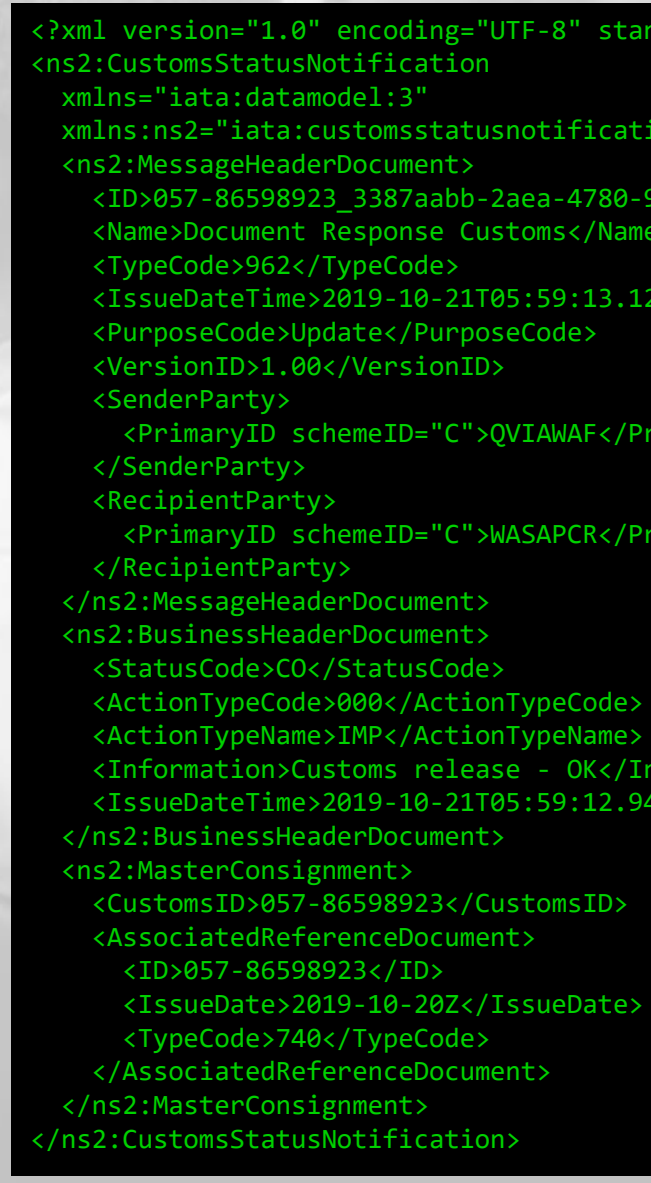
'What is it?'
'Where is it coming from?'
'Where can or will it be used for?'
'Where is it going to?'

When you identified military/strategic goods you should obtain all necessary information and documents such as licenses from the customer in order to start the Approval Workflow. Once the shipment is approved, the shipment can be accepted, booked and continue its way within our air cargo supply chain.



Using available industry solutions?
Cargo XML messaging

- Customs Status Notification
- Via XML messaging
- Stop shipment at Ground Handler ***at origin***
- Shipment unable to move until issue resolved



Prepare for continuous change

Role of the authority

Maintaining safety becomes increasingly difficult for a single entity in the supply chain (the operator)

- Ensuring flight safety remains with the operator
- Authority reaction to threat remains; increase regulations
- Mitigation measures for operators are still largely at the “right’ side of the bow-tie
- A supply chain approach is needed to move to the left

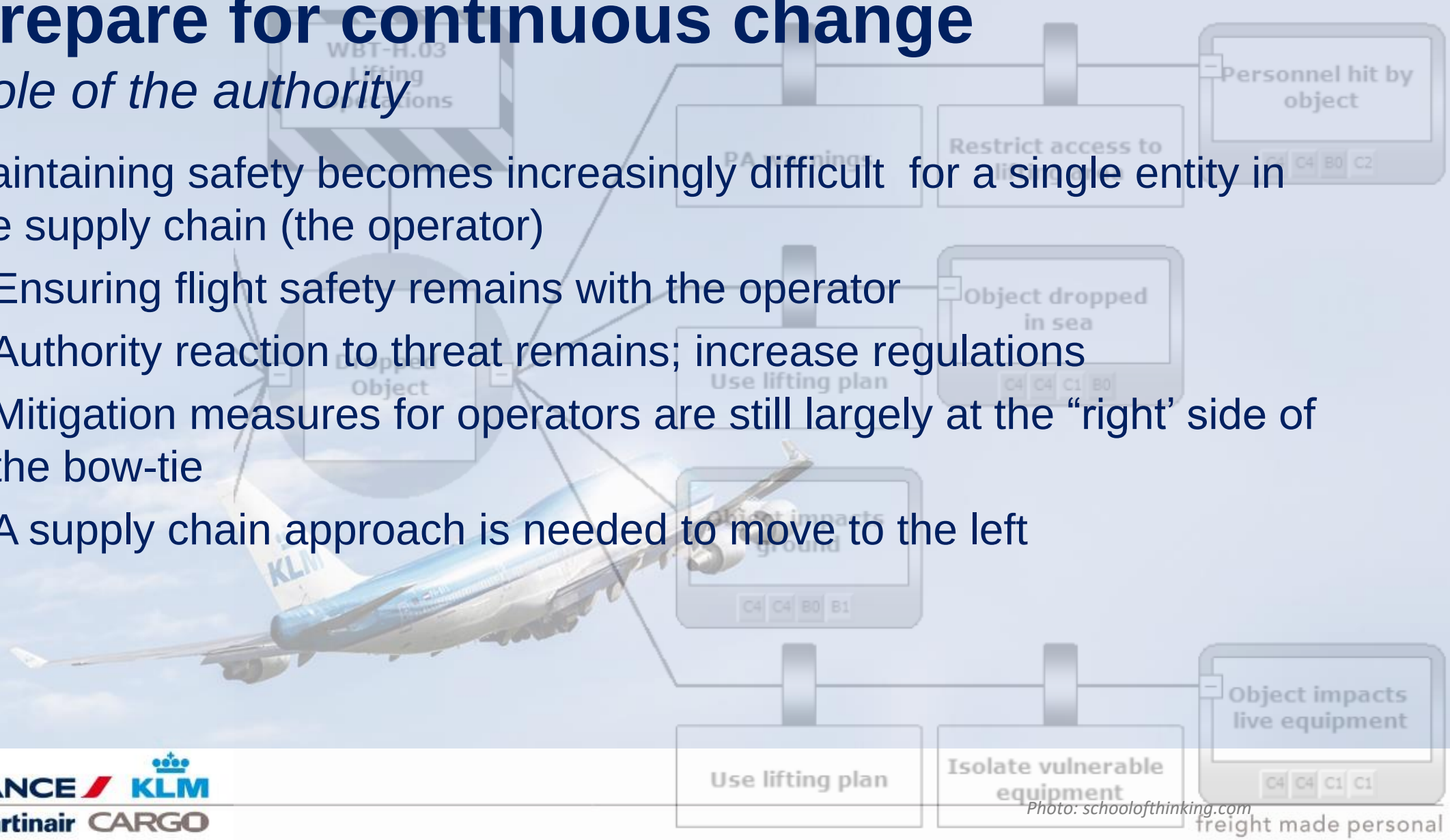
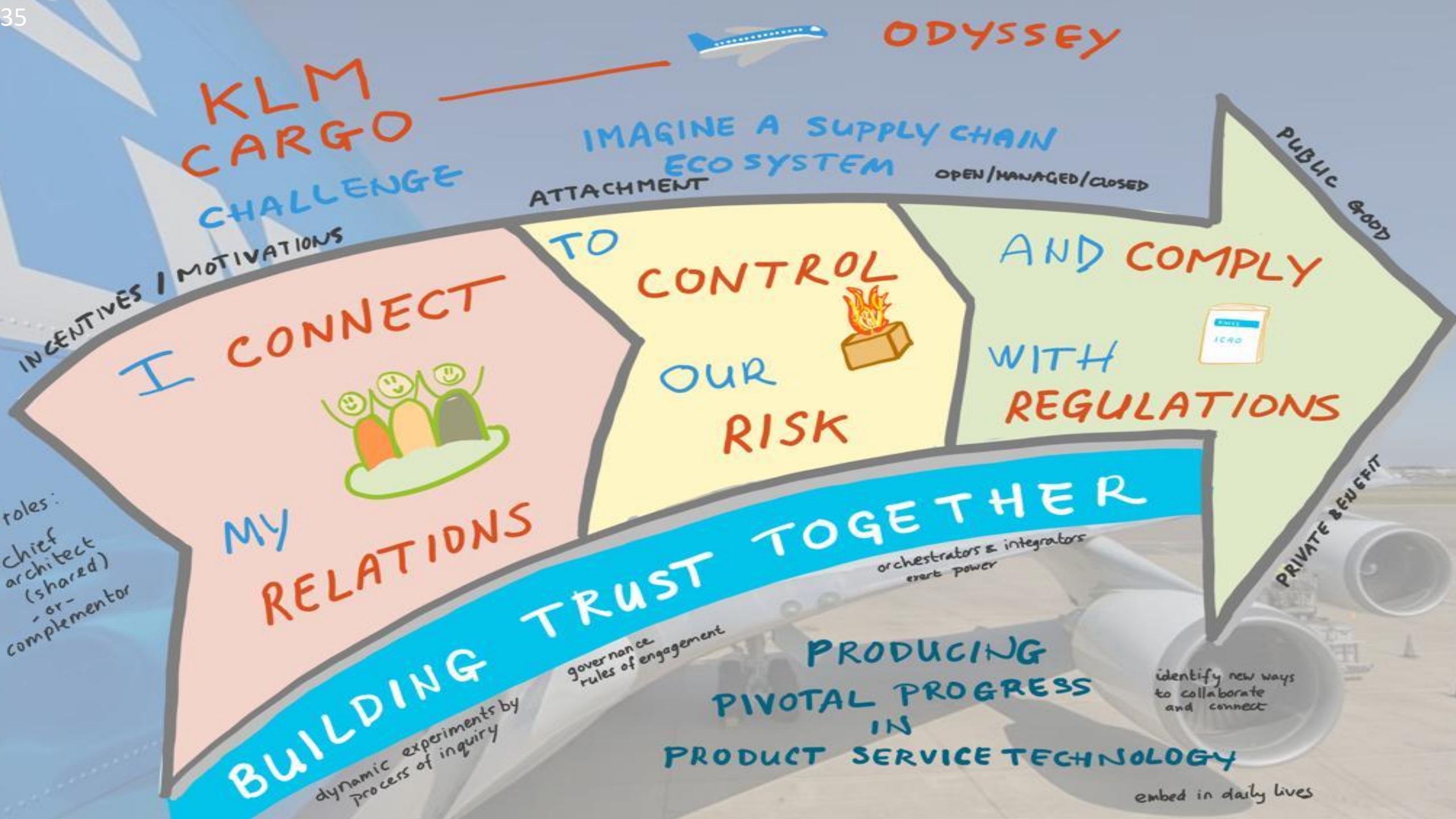


Photo: schoolofthinking.com

Integrate (& innovate)

Integration of supply chain solutions could be effective:

https://www.cpsc.gov/Recalls


KLM CARGO
CHALLENGE
ODYSSEY
IMAGINE A SUPPLY CHAIN ECO SYSTEM
ATTACHMENT
OPEN/MANAGED/CLOSED
PUBLIC GOOD
INCENTIVES / MOTIVATIONS
I CONNECT
MY RELATIONS
TO CONTROL
OUR RISK
AND COMPLY
WITH REGULATIONS
PRIVATE BENEFIT
BUILDING TRUST TOGETHER
roles:
chief architect (shared) - or - complementor
dynamic experiments by process of inquiry
governance rules of engagement
orchestrators & integrators exert power
PRODUCING PIVOTAL PROGRESS IN PRODUCT SERVICE TECHNOLOGY
identify new ways to collaborate and connect
embed in daily lives


AIRFRANCE
KLM
Martinair CARGO
freight made personal

Safety Risk Assessment
Control Mitigations

Christophe Requile
Coordinator Standards
Cargolux

IATA LITHIUM BATTERY WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

IATA

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Operational mitigation solution for the carriage of lithium batteries

Christophe Requile

IATA LIBAT Workshop Amsterdam OCT 19

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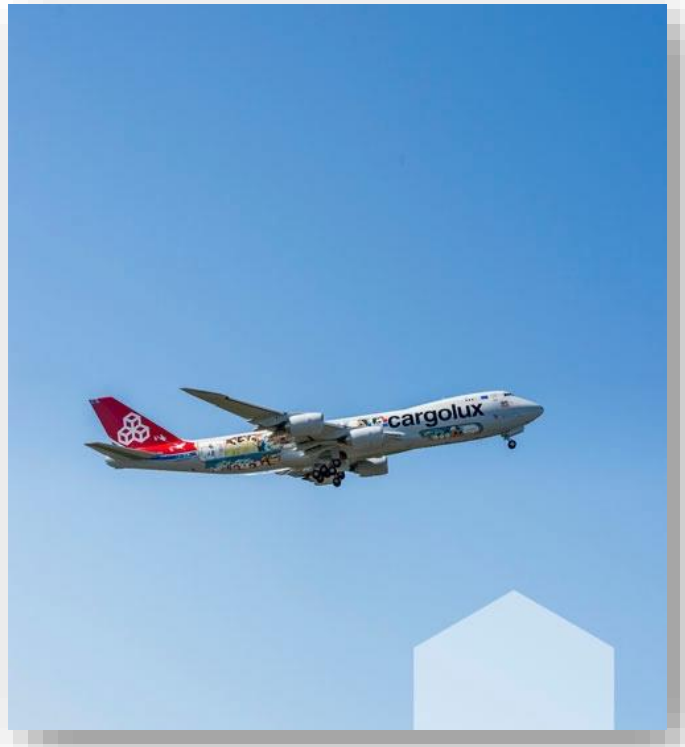
you name it, we fly it !

Cargolux

- Founded in March 1970: over 45 years of experience in all-cargo services
- Operating a modern and energy-efficient fleet of 30 aircraft (Boeing 747F)
- 2,027 employees worldwide (incl. Cargolux Italia)
  1,436 employees in Luxembourg
- Dual Hub Strategy with Zhengzhou Airport initiated in 2014

→ Europe's #1 all cargo carrier, #5 worldwide



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you name it, we fly it !

Cargolux Network

Cargolux Destinations Map

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you name it, we fly it !

Limited Onboard capabilities

- Halon system is not enough to stop a Lithium Battery fire!
  - *"Fire suppression agent: the current fire suppression systems for class C cargo compartments use Halon 1301. Halon 1301 is not expected nor designed to fully extinguish an aircraft fire. It is designed to suppress a fire, reducing the heat and energy intensity of the fire and to prevent re-ignition of the suppressed fire, to allow the aircraft to safely land at the nearest suitable airport. Halon is not effective for any type of metal fire, resulting in very limited effect for fires involving lithium metal batteries. Halon also has limited effectiveness on a lithium ion battery fire. This agent is not able to stop/prevent lithium ion- and lithium metal battery thermal runaway, nor does it prevent propagation of thermal runaway from one cell to the next."*
    - *Dangerous Goods Panel (DGP) working group meeting, May 2015, Montreal*
- <u>18 minutes to land once the fire has started</u>

cargolux
you name it, we fly it !

Result: CV03/CV04

Full ban on UN3480/3090 in 2015

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Multi-layered approach: additional barrier required

New set up to ensure compliance with the regulations

Development of the Fire Containment Cover

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you name it, we fly it !

Complying with the regulation: A real challenge

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you name it, we fly it !

Regulation vs Compliance

- As per IATA DG regulation:

3.9.2.6.1 Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form must be assigned to UN 3090, UN 3091, UN 3480 or UN 3481, as appropriate. They may be transported under these entries if they meet the following provisions:

(a) each cell or battery is of the type proved to meet the requirements of each test of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3. Cells and batteries manufactured according to a type meeting the requirements of subsection 38.3 of the UN *Manual of Tests and Criteria*, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in these Regulations. Cell and battery types only meeting the requirements of the UN *Manual of Tests and Criteria*, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before 1 July 2003 may continue to be transported if all other applicable requirements are fulfilled.

Note:
Batteries, including those which have been refurbished or otherwise altered, must be of a type proved to meet the testing requirements of the Manual of Tests and Criteria, Part III, subsection 38.3, irrespective of whether the cells of which they are composed are of a tested type.

(b) each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport;

(c) each cell and battery is equipped with an effective means of preventing external short circuits;

(d) each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);

(e) cells and batteries must be manufactured under a quality management program that includes:

1. a description of the organizational structure and responsibilities of personnel with regard to design and product quality;
2. the relevant inspection and test, quality control, quality assurance and process operation instructions that will be used;
3. process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;
4. quality records, such as inspection reports, test data, calibration data and certificates. Test data must be kept and made available to the appropriate national authority upon request;
5. management reviews to ensure the effective operation of the quality management programme;
6. a process for control of documents and their revision;
7. a means for control of cells or batteries that are not conforming to the type tested as mentioned in (a) above;
8. training programmes and qualification procedures for relevant personnel; and
9. procedures to ensure that there is no damage to the final product.

Note:
In house quality management programmes may be accepted. Third party certification is not required, but the procedures listed in 1. to 9. above must be properly recorded and traceable. A copy of the quality management programme must be made available to the appropriate national authority upon request.

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Ensuring compliance

Shipper/Forwarder

Battery manufacturer

Airline validation

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Ensuring compliance

Manufacturer
- UN38.3
- QMS

Shipper
- DGD
- UN38.3
- QMS

Forwarder
- AWB
- DGD
- UN38.3
- QMS

Airline validation

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TRACEABILITY IS KEY

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Proactive & reactive barriers

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Training

- Specific training provided to staff at selected gateways.
- Ground Engineer specifically trained to analyze UN38.3 and QMS documentation.
- DG specialists gathering all documentation from booking staff and ensuring the batteries are approved.

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Ecare

Table Of Contents | eCARE | My eCARE | Appendices | Highlights | Display by | Learn more | Recent | About eCare

Tools
Print document
History of changes

cargolux cargolux ITALIA Ground Operations Manual - CARE

COMPLIANCE / APPROVALS

290.5 Approval of Lithium Ion Batteries (UN3480)

290.5 Revision: 1.33 Effective: 23APR19

290.5

(a) In order for the Operator to mitigate the risks, a shipper must seek and obtain approval (1) from Ground Standards & Procedures Department, prior to offering Lithium Ion Batteries (UN3480) for carriage on CV/C8 flights.

See list of approved stations in Annex C below.

(b) The following data must be provided prior to first shipment:

- Evidence (i.e. copy of the test report) that the battery/cells are of a type proved to meet the requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3,
- A certificate that the batteries are manufactured under a quality management system/program.

(c) Ground Standards & Procedures Department will maintain records of approved Lithium Ion Batteries.

- Electronic Cargolux Regulations
- Online tool accessible for the whole network
- All procedures gathered into one portal

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FCC: Fire containment cover

- CV conducted a comprehensive Safety Risk Assessment to identify the hazards, determine the level of risk and explore potential solutions

- 3 actions:

  1. Containing
  2. Extinguishing
  3. Cooling

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FCC: Fire Containment Cover

- The fire was fully contained and developed very slowly due to oxygen starvation by the FCC and cooling by the gel packs. It was totally extinguished by the gel in less than 12 hours.

Embargo partially lifted

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Overview

Booking
- No interline accepted
- Batteries
  - tested as per UN38.3
  - manufactured under a quality management system

Acceptance
- No LiBat in SBU accepted
- Documents checked
- Packages checked for damages

Build-Up
- Packages checked for damages
- Apply segregation rule
- Deploy FCC and gel

Loading
- ULD inspected for damage

Flight
- FCC
- Diversion
- Oxygen Mask and EVAS

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Challenges

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Challenges

- We challenge our clients to ensure compliance with the regulations and avoid counterfeits batteries

→

- But UN38.3 and Quality Management System are not well known amongst the supply chain
- Neither the forwarder, nor the shipper are battery specialists.
- Battery manufacturers not yet accustomed to share these information
  - *“Why would you need our QMS?”*
- QMS only guarantees the battery was safe when it was new!

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Lithium batteries in Airmail

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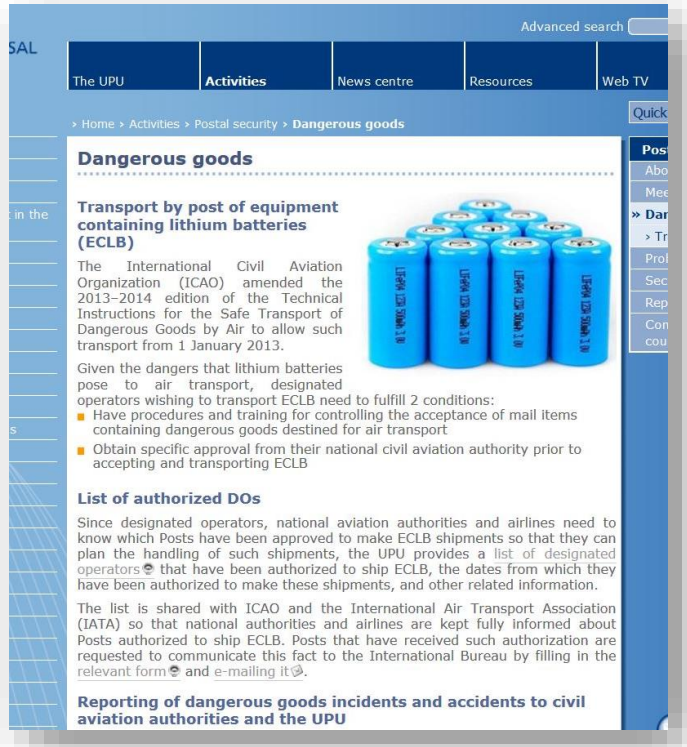
LIBAT in airmail

- UPU published a list of Postal Operators allowed to accept UN3481 in airmail
- Postal Operators must obtain prior approval from the Civil Aviation of the country <u>where the Airmail is accepted</u>



→ What is safer? Approved or non Approved? Does it make a difference?

→ Acceptance process not harmonized

→ Screening process not guaranteed by Postal operators

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Reaching out to the industry

- Represented at the IATA Air Mail Board
- Creation of the IATA Air Mail Safety working group
  - Reviewing existing regulation
  - Share safety initiatives and outcome
  - Reach out to regulator with proposal for improvement

→ The current state of the Postal safety is not up to airline standards

→ Relying solely on airport screening capabilities is no acceptable

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Lithium Batteries in Ecommerce

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LIBAT in Ecommerce

- *"He (*Glyn Hughes, IATA Global Head of Cargo) *showed a scanned AWB for a Philippine Airlines consignment of leather cases, chargers and screen protectors, which clearly stated "no batteries, no magnets". In fact, the shipment contained thousands (300 boxes, weighing six tonnes) of lithium batteries, which were not packed properly, labelled or declared. Fortunately the shipment was discovered smoking in a warehouse before loading."*

The Loadstar "IATA warns of growing threat to aircraft from e-commerce lithium battery sales" 16SEP2015

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General commodities

E-PACKETS,GARMENTS,
BELT,
PHONE CASE
(WITHOUT BATTERY)
SHOES,
SCARF,HEADSET,CAP,

Nature and Quantity of Goods (incl. Dimensions or Volume)
E PACKETS

- So many different commodities, does not fit on AWB
- "*Guidelines on acceptable and unacceptable terms for the description of goods for exit and entry summary declarations."* from EU commission
- DGR 2.2.2 *"**Hidden dangerous goods**: Cargo Declared under a general description may contain hazardous articles that are not apparent"*

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Commodities?

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Hybrid scenarios

- We **MUST** know what we are transporting
  - List of suspicious commodities available online.
    - ➢ Triggers challenging questions at booking
  - Generic description of the goods = **no go!**
  - Cargo aimed at being transformed into Mail at later stage?
    - ➢ must provide detailed list of commodities!
  - Systematic X-ray screening at critical Ecommerce gateways

GROUND OPS / CARGO, LIVE ANIMALS & AIRMAIL / NORMAL PROCEDURES

Identification of hidden Dangerous Goods

310.5 Revision: 3.11 Effective: 13NOV17

CV alive CV fresh CV hazmat CV jumbo CV pharma CV power CV precious

(a) Reasonable measures shall be taken to detect non-compliant shipments and avoid the transportation of hidden dangerous goods in cargo and airmail. Extra steps include increased scrutiny of the paperwork ([1]) accompanying the shipment.

(b) Confirmation shall be sought from the shipper/forwarder about the contents of any consignment whenever there is any suspicion that it may contain dangerous goods.

Commodities that may contain hidden dangerous goods typically include, but are not limited to:

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Pending questions

- Carriers have implemented pro-active barriers to ensure batteries were not counterfeit and reactive barriers to maintain a lithium fire under control.
  - Limit of an FCC is about Watt Hour Rating
  - LIBAT in cargo are in KG and section IA/IB/II
- Legitimate manufacturers, shippers and forwarders are doing their best to comply with airlines' increasing requirements
  - Were they the initial target when drafting these processes?
  - Aren't we "punishing" the wrong stakeholders?

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Conclusion

1. Lithium batteries are still not easily detected by X-ray machines
2. Relying solely on Airport and Airlines is not acceptable
3. Postal/Cargo hybrids are by-passing most safety barriers
   - How are CAAs monitoring their Postal Operator?
   - General commodity description must be stopped by carriers
   - Handling of airmail/Hybrids is not suitable for Dangerous Goods
4. “Trust the shipper”
   - But who is the shipper?

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As an industry, we should focus on undeclared Dangerous Goods instead of hammering legitimate stakeholders with additional requirements.

Carriers/Operators cannot tackle this on their own, we need the whole supply chain to analyze the gaps and to provide solutions.

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Ecommerce, Postal/cargo hybrids and BUPs are the critical areas of risk

Risk mitigation is the whole supply chain responsibility, not just the carrier/GHA

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Thank you!

Networking Lunch 12:30 – 14:00

Kindly sponsored by;

iSHARE

IATA
LITHIUM
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WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

Where are we with test standards for fire-resistant containment covers / fire containment bags?

Moderator:

Candy Chan

Manager Dangerous Goods Standards

IATA

Panelists:

Tharindu Senanayaka,

Business Unit Manager Cargo, Amsafe Bridport

Peter Chittenden, Cabin Safety Expert, EASA

Kim Melville, Senior Director Global Airside and Standards,

Head of Safety, DHL Express

IATA CARGO EVENTS

Amsterdam, Netherlands
29-31 October 2019

IATA

What are the current standards?

SAE AS6278, ISO 19281:2016

Tested with Class A fire

Developed for Class B, E, F cargo compartments

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What are the current standards?

SAE AS6453, TSO C203, TSO C90e

Tested with Class A fire

Developed for Class B, E, F cargo compartments

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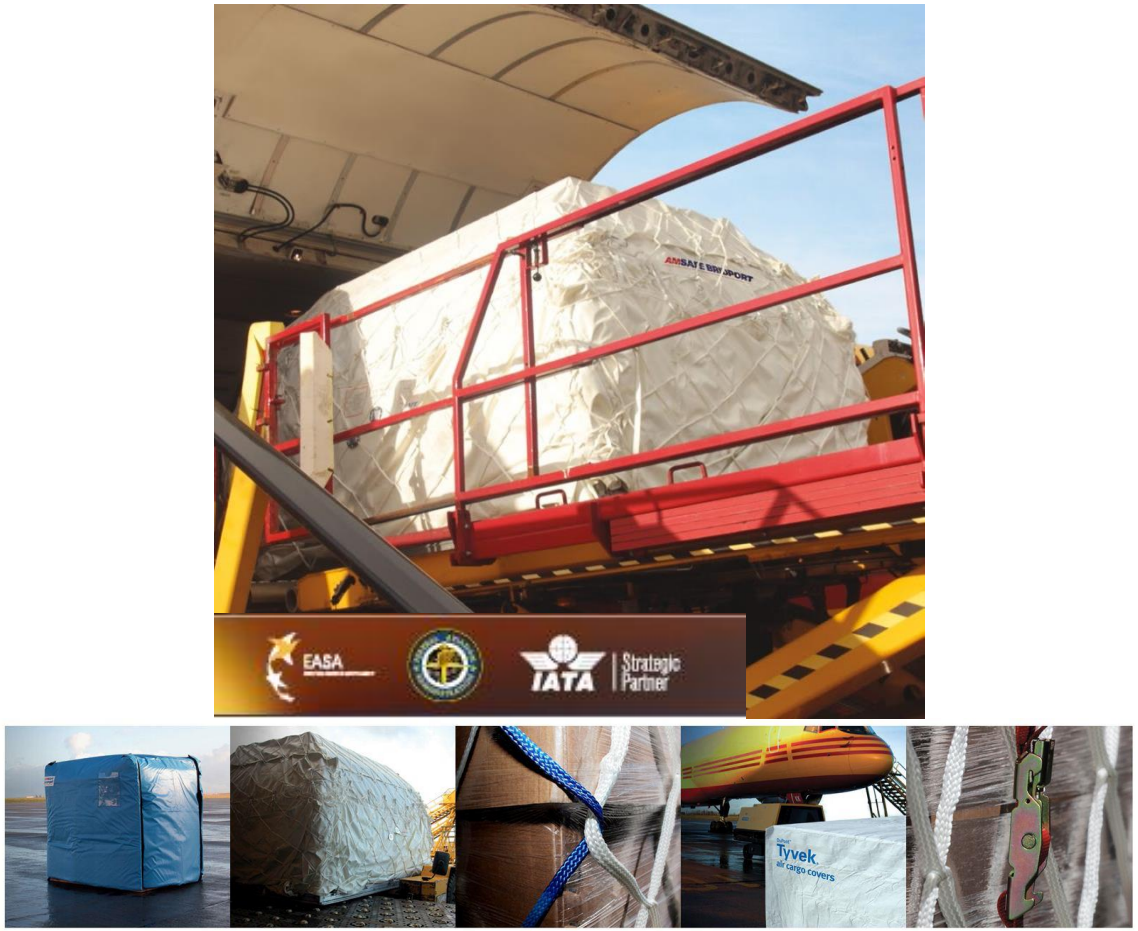
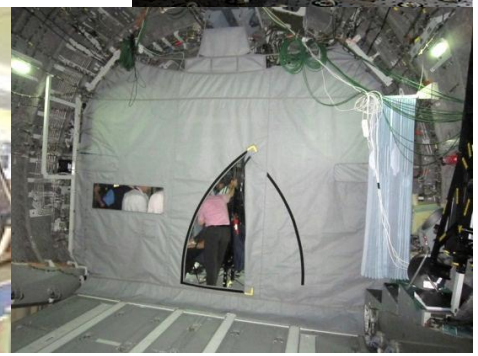


FIRE CONTAINMENT SOLUTIONS – R&D AND TESTING

Tharindu Senanayake

30th October, 2019

- The Specialist in Aviation Restraint and Safety Technology products including
  - _ Tarian® Armour System
  - _ 9G aircraft barrier nets, with smoke/thermal protection
  - _ Fire containment products
- Tier 1 supplier to Airbus, Boeing, etc.
- World leader in cargo restraint equipment
- Leading supplier to Defence forces worldwide



Declared Li-ion Bulk Shipments

- Flammable gas release
- Even at 30% SOC, a 2600mAh 18650 battery cell releases 1.5 liters of flammable gas

Undeclared Li-ion content

- Rechargeable device sales rising
- Cross Border E-Commerce rising
- Increase in individual shipments
- DG shipments are complex and expensive
- Risk of fires that cannot be stopped by existing Halon systems

WHAT IS FCC/ FRC ETC.? WHAT IS THE OPTIMUM SOLUTION?

- **FCC** – Fire Containment Cover (for palletized loads)
  FRC – Fire Resistant Container (for ULD containers)
  FCB – Fire Containment Bag
  CFCC – Container Fire Containment Cover (used over ULD containers)

- Developed as a solution to UDG, Lithium battery shipments, mobile electronics (10+ years at ASB)

- TSO-C203 certified (FAA/EASA) and meets SAE AS6453 & ISO 14186 requirements

- Fire Resistant Fabric Cover
  - Passive system
  - Fire Barrier - Oxygen suppression secondary function
  - Patented designs

- FRC – ISO 19281 released, AS8992 WIP

- Tested with Class ‘A’ fire & Lithium-ion battery fire

- Palletized main deck cargo – Class E & B (optional for Class C and other compartments)

- Extensive trials & testing fed back into design

- Already in revenue service and trials
  (UPS, LH, Blue Dart, Cathay Pacific, DHL, etc.)

AmSafe Bridport *(INTERNAL)* TEST

- Test spec defined by Operator and ASB
- FCC dimensions 125” x 96” x 96” height
- Qty of 1,500 Lithium-ion batteries
- 18650 type cells – 2600mAh, 3.7V, SOC 70%-90%
- Battery boxes placed in 3 positions
- Result: **PASS**
  - All batteries vented
  - No external flames beyond limits
  - Peak temperatures measured 4” away below 204°C (400°F)

FAA *(EXTERNAL)* TEST

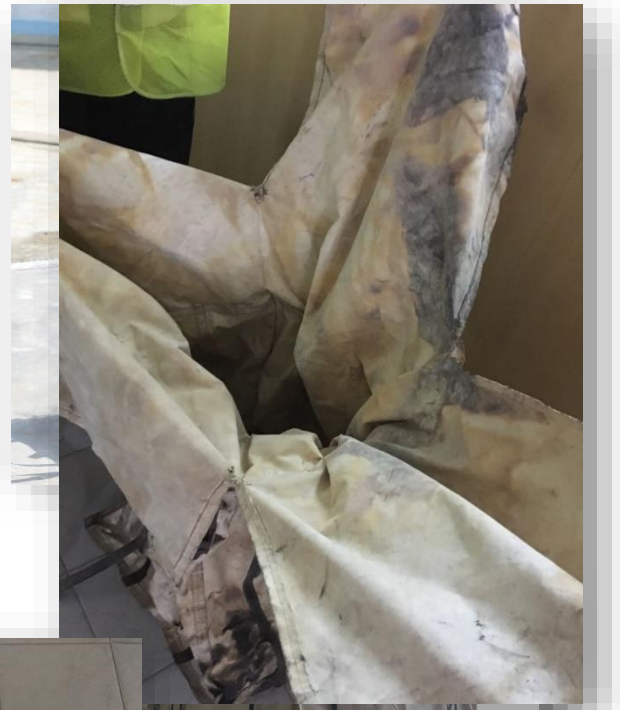
- Test method defined by FAA (no standardised test)
- FCC dimensions 125” x 96” x 96” height
- Qty of 1,000 Lithium-ion batteries
- 18650 types cells – 3000mAh, 3.7V, SOC 30%-40%
- Battery boxes placed in 1 position, pallet corner
- Result: **FAIL**
  - Batteries escaped confines of FCC / pallet
  - All batteries vented

FCC MIXED CLASS LOAD FIRE TEST (INTERNAL)

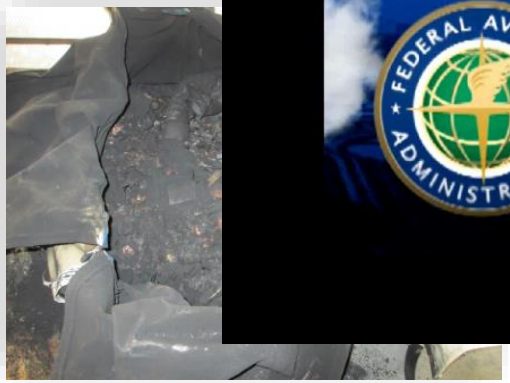
- FCC solution for OEM aircraft conversion project. Test method defined by OEM and FAA, and test witnessed by FAA-DER.
- FCC dimensions 108” x 88” x 96” height, 463L pallet compatible
- Class A material, Class B flammable fluid (3.75-liter ethanol), Class D (300 lithium-ion batteries)
- Two tests conducted; Damaged and Repaired condition.
- Result: **PASS** (both tests)
  - No flame penetration / burn-through
  - Peak temperatures measured 4” away below 204°C (400°F)
  - External flames within allowable limits

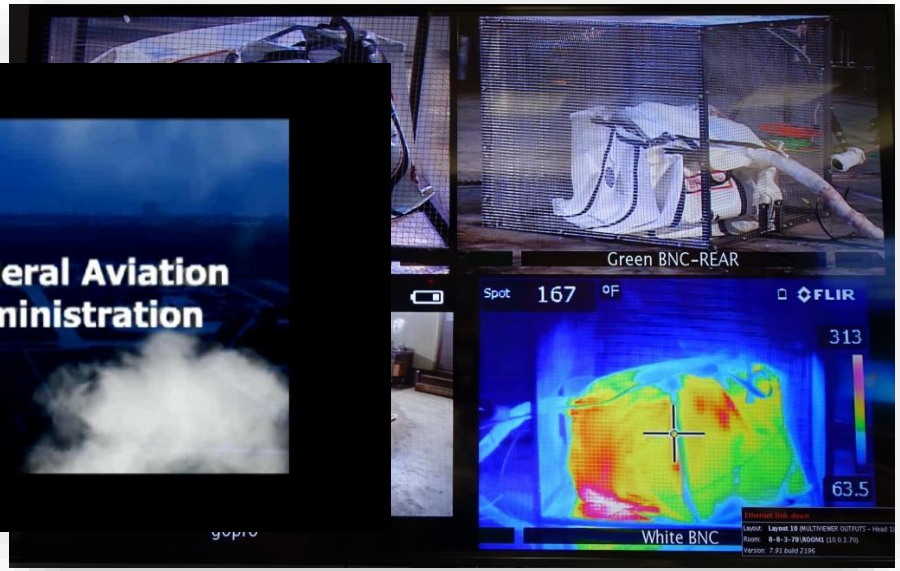
FIRE CONTAINMENT BAG (FCB)

- A derivative of the FCC, developed for smaller cargo loads
- Uses same technology as FCC, and will contain Class ‘A’ and Lithium-ion fires for up to 6 hours
- Allows smoke to be released, ensuring detection systems continue to activate
- Can be used as an ‘OVERPACK’ at any stage of supply chain
- Enabled airlines to lift battery shipment embargo
- Protected aircraft in real life fire



- Testing conducted by the FAA
- FCB dimensions 24” x 24” x 20”
- Qty of 1,000 Lithium-ion batteries
- 18650 type cells – 3000mAh, 3.7V, SOC 30%-40%
- Load consisted only of batteries
- Result: **PASS**
  - _ All batteries vented
  - _ No external flames
  - _ No batteries escaped





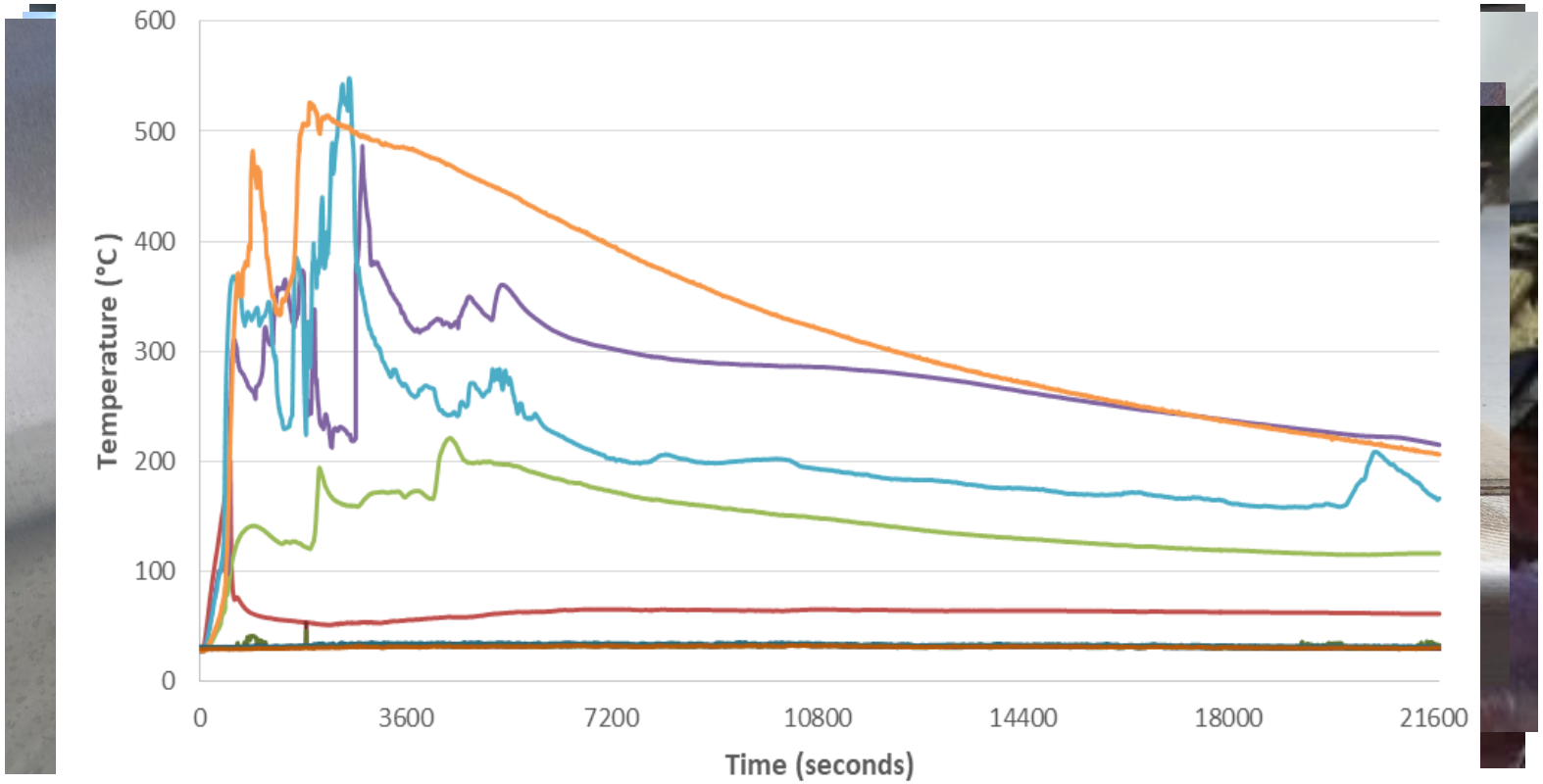
CONTAINER FIRE CONTAINMENT COVER (CFCC)

- A derivative of the FCC, developed as a solution for use over standard ULD Containers.
- Customizable to all ULD contours.
- Already in revenue service and trials

CFCC MIXED CLASS LOAD FIRE TESTS (AKE)

- Test spec defined by Operator and ASB
- AKE metal container with metal door, in new condition
- Mixed Class Load
  - _ Class A material (36 boxes with shredded paper)
  - _ Class B flammable fluid (2.0-liter ethanol)
  - _ Class D (2,000 lithium-ion batteries)
- 18650 type cells – 2600mAh, 3.7V, SOC 50%

- Result: **PASS**
  - 6 hour fire containment
  - >75% of batteries vented
  - No flame penetration / burn through
  - No external flames
  - Peak temps 4” away below 204°C (400°F)
  - 4 min 30 sec – initial smoke visible
  - Peak internal temp – 548°C (1018°F)
  - Side & Door peak temp (4” away) – <34°C (93°F)
  - Peak Surface temp – 70°C (158°F)
  - Container fire damaged beyond limits



CFCC MIXED CLASS LOAD FIRE TESTS (AMJ)

- Test spec defined by Operator and ASB
- AMJ metal container with fabric door, in used condition
- Mixed Class Load
  - _ Class A material (144 boxes with shredded paper)
  - _ Class B flammable fluid (4.0-liter ethanol)
  - _ Class D (5,400 lithium-ion batteries)
- 18650 type cells – 2600mAh, 3.7V, SOC 50%
- FCB with 400 cells, included into test load

- Test Plan Revision
  - _ Phase I (4 hours)
  - _ Phase II ('worst case' configuration)
    - Open pull flaps
    - Unsealed cover

CFCC MIXED CLASS LOAD FIRE TESTS (AMJ)

- Result: **PASS *(Phase I)***
  - 4 hour fire containment
  - No flame penetration / burn through
  - No external flames
  - Peak temps 4” away below 204°C (400°F)
  - 1 min 20 sec – initial smoke visible
  - Peak internal temp – 581°C (1078°F)
  - Peak external temp – 88°C (190°F)
  - Container fire damaged beyond limits

CFCC MIXED CLASS LOAD FIRE TESTS (AMJ)

- Result: ***Phase II***
  - +35min test terminated
  - >75% of batteries vented
  - Fabric failure / burn-through
  - External flames
  - Battery ejections
  - Peak internal temp – 1000°C+ (1832°F)
  - Peak external temp – 88°C (190°F)
  - Peak temps 4” away above 204°C (400°F)
  - FCB compromised & all 400 cells vented

Thank you for your time

DHL EXPRESS –OUR APPROACH TO LITHIUM BATTERIES

Kim Melville - Senior Director Global Airside and Standards

October 2019

DHL Express Oct 2019

1. We have 10 recorded (smoke, Fire, Fumes) SFF shipment incidents in the last 4 years within the DHL Express global transport network, 2 of these were on-board aircraft.

2. In July 2015 DHL Air presented the risks of Smoke, Fire & Fumes (SFF) from cargo at the Inaugural DHL Global Airside Safety Management Conference. This resulted in the formation of a DHL Global SFF Workgroup chaired by Global Airside Department.

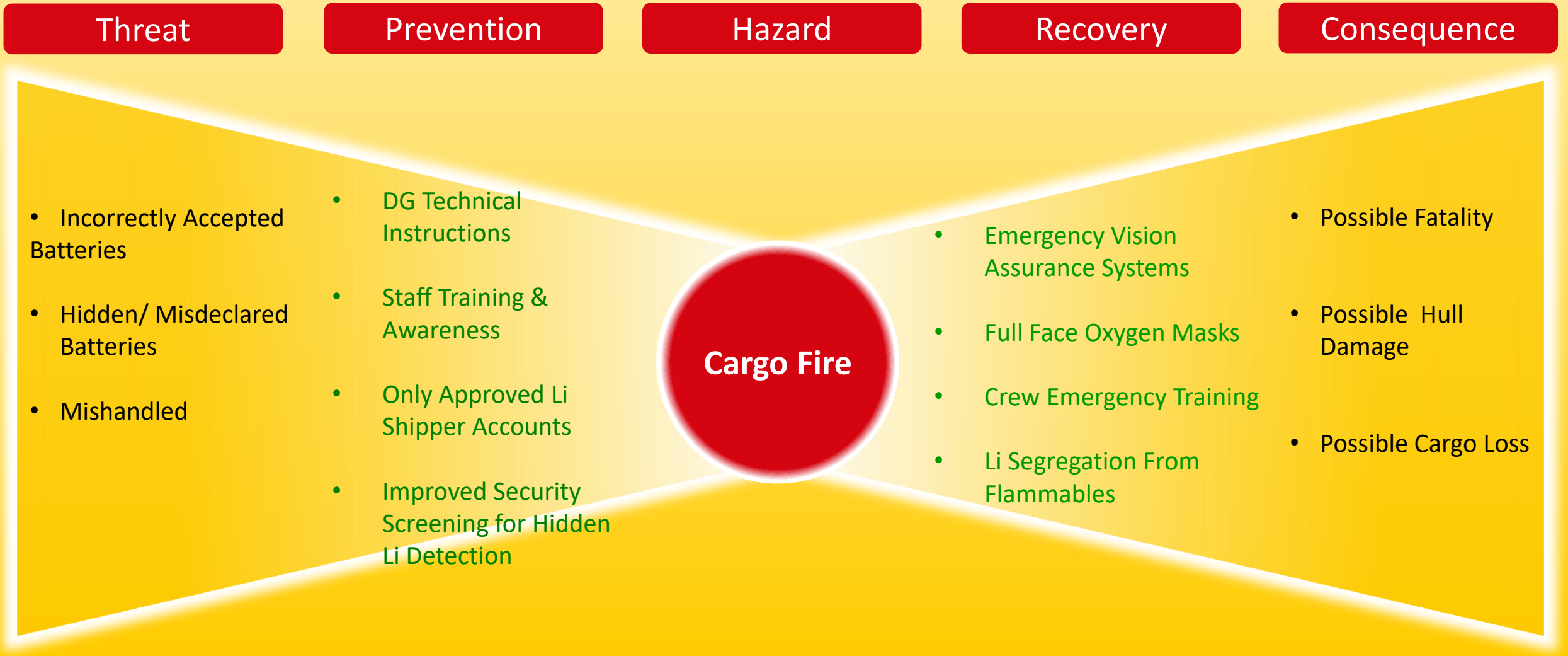
3. The DHL Express Global SFF working group now comprises of 16 members from the main DHL Express airlines plus representatives from Global Aviation Risk, DHL Restricted Commodities and the DHL Network Equipment Group.

DHL EXPRESS, Oct 2019

4. DHL SFF workgroup achievements to date;

- Achieved a cross-airline understanding of the risks presented by modern energy storage devices and developed several mitigation actions, EVAS, Full Face Oxygen masks, Separation of Batteries from Flammables, use of Class ‘C’ Cargo Compartments when available. **See Bow-Tie mitigations slide**.
- Produced Airline and DHL group Risk Assessments and Risk Registers for routine review & amendment.
- Identified ‘high risk’ DHL Express air routes: HKG-DEL is high risk, large quantities of ACL batteries for phones. Trial commenced for use of FCCs on this sector.
- **Established a DHL minimum specification for fire retardant ULD’s** (due to lack of industry specifications) introduced 8000+ DHL developed ULD’s with enhanced fire containment design features into service (total global inventory of over 30,000 units), all new ULD’s will meet this specification.
- Initiated Fire Containment Bag (FCB) trial on the UK-US-UK route lanes from May 2018 for Network assessment of FCB handling. 52 FCBs fully introduced into the AP network to enable movement of PI965s within the region.
- Produce articles and communications on the subject throughout the organisation to highlight the risk and mitigation strategy.

Progressive Safety Mitigation – Bow Tie



Progressive Safety Mitigation – Bow Tie

Threat	Prevention	Hazard	Recovery	Consequence
• Incorrectly Accepted Batteries • Hidden / Misdeclared Batteries • Mishandled Batteries		**Cargo Fire**	• Use of ‘Class C’ Aircraft compartments when available • Deployment of FCC’s & FRC’s • Definition of Bulk & Volume ?	• Possible Fatality • Possible Hull Damage • Possible Cargo Loss

Fire Containment Bags (FCBs)

- 52 AmSafe FCBs deployed into the AP region after initial trials on the US-EU transatlantic sector and further trials within the AP Network proved successful.
- FCC's initially trialled on HKG-DEL sectors however further trials are required before a decision can be made on operational viability of the FCC.
- FCBs are a mixture of 0.5m³ or 1m³ in volumetric capacity so only capable of transporting relatively small numbers of small shipments.

Enhanced Fire Resistant Containers

- All new containers purchased by DHL will have enhanced fire resistant properties implemented as standard.
- Enhanced properties are designed to restrict the inflow of oxygen into the container so as to starve the fire of fuel (oxygen).
- Proven to contain a full scale Class A (paper based) fire.
- Next focus area is to look at active fire suppression within the container.

THANK YOU

IATA Lithium Battery Workshop

Amsterdam 29 to 30 October, 2019

Fire Containment Covers/Fire Resistant Containers/Fire Resistant Bags

Peter Chittenden
EASA
Certification Directorate

Your safety is our mission.

An agency of the European Union

FCC/FRC/FRB

ICAO has prohibited transport of lithium batteries as cargo on passenger aircraft until controls are put into place which establish an acceptable level of safety.

Performance-based packaging standard is identified as one such control & SAE G27 committee has been working since February 2016.

EASA and European Commission initiated SABATAIR project to input into G27 work, support development of battery transport safety risk assessment approaches, and to identify/assess additional mitigating measures.

External fire threat is identified as additional risk that needs addressing.

Considerations in work. G27 package itself might provide protection in some cases, or perhaps use of FCC/FRC/FRB meeting additional requirements.

EASA
European Aviation Safety Agency

Thank You

Your safety is our mission.

An agency of the European Union

E-Commerce and Mail
A Risk or Opportunity?

Moderator:

Bart Pouwels

Head of Cargo

Amsterdam Schiphol Airport

Panelists:

Dawn Wilkes, Security Program Manager, UPU

Alex McCulloch,

International Standards Dangerous Goods Manager, UPS

James Wyatt, General Manager, aeroconcept

IATA CARGO EVENTS

Amsterdam, Netherlands
29-31 October 2019

IATA

Networking break 15:30 – 16:00

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40th Anniversary 1979-2019
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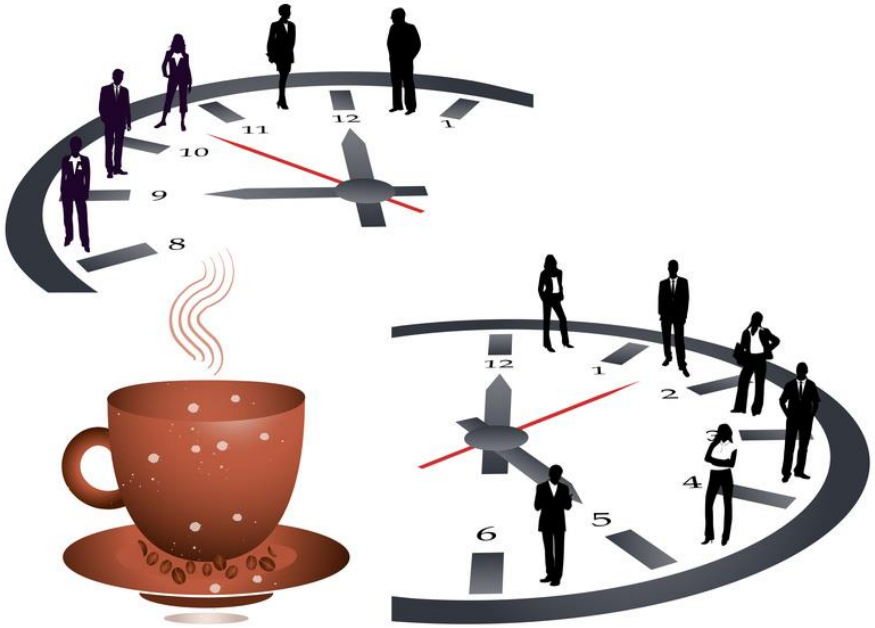

IATA
LITHIUM
BATTERY
WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

Q & A Session

Questions

- *Lithium Batteries Risk Mitigation - Prevention Controls - Future Development*

IATA LITHIUM BATTERY WORKSHOP

IATA

Questions

- *Lithium Batteries Risk Mitigation - Prevention Controls - Future Development*
- *How to transport defective lithium power banks from consumers (consumer complaints) back to manufacturer ?*

IATA LITHIUM BATTERY WORKSHOP

IATA

Questions

- *Lithium Batteries Risk Mitigation - Prevention Controls - Future Development*
- *How to transport defective lithium power banks from consumers (consumer complaints) back to manufacturer ?*
- *What are airlines and freight forwarders going to do to ensure that lithium cell and battery manufacturers have made available the Lithium Battery Test Summary Document?*

IATA LITHIUM BATTERY WORKSHOP

IATA

Questions

- *What obligation do lithium battery powered product manufacturers have to verify that the Lithium Battery Test Summary Document is available?*

IATA LITHIUM BATTERY WORKSHOP

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Questions

- *What obligation do lithium battery powered product manufacturers have to verify that the Lithium Battery Test Summary Document is available?*
- *Has there been any further consideration of defining a consignment related to application of P967?*

IATA LITHIUM BATTERY WORKSHOP

IATA

Questions

- *What obligation do lithium battery powered product manufacturers have to verify that the Lithium Battery Test Summary Document is available?*
- *Has there been any further consideration of defining a consignment related to application of P967?*
- *When will there be separate UN numbers for lithium batteries contained in equipment and shipped with equipment?*

IATA LITHIUM BATTERY WORKSHOP

IATA

Questions

- *The transport of e-commerce shipments that are sent in so-called postal shipments under the exception of UN3481 Lithium ion batteries in equipment. It has been established that UN3481 Lithium ion batteries with equipment and also frequent power banks falling under UN3480 Lithium ion batteries are also sent in the bags in question. These bags were sent on PAX. Also is the question when is the shipment in a mail bag actually mail? Is that only from DPO to DPO?*

Thank you

David Brennan

brennand@iata.org

www.iata.org/dangerousgoods

Closing Remarks

Geoff Leach

Director

DG Office UK

IATA LITHIUM BATTERY WORKSHOP

Amsterdam, Netherlands
29-30 October 2019

IATA


IATA
CARGO
EVENTS
6 – 8 October 2020
Manchester, UK
Save the date!
TELEPHONE
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TELEPHONE
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