国 际 民 用 航 空 组 织

DGP/25-WP/8
25/8/15

工 作 文 件

危险物品专家组（DGP）

第二十五次会议

2015年10月19日至30日，蒙特利尔

议程项目**5：** 拟定一项全面战略以降低与锂电池运输相关的风险，包括拟定基于性能的包装标准并努力促进合规

第三次锂电池运输多学科国际协调会议的报告

（由秘书提交）

摘要

请危险物品专家组在讨论拟定一项全面战略以降低与锂电池运输相关的风险期间，对第三次锂电池运输多学科国际协调会议报告中所载的建议做出考虑。

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附录

第三次锂电池运输多学科国际协调会议的报告

国 际 民 用 航 空 组 织

5/8/15

锂电池运输多学科国际协调会议

第三次会议

2015年7月28日至30日，蒙特利尔

第三次会议的报告

1. 引言

1.1 2015年7月28日，空中航行局局长斯蒂芬·克莱默先生宣布第三次锂电池运输多学科国际协调会议在蒙特利尔开幕。会议由欧洲航空安全机构（EASA）的恩佐·卡纳里先生和联邦航空局（FAA）威廉J·休斯技术中心的理查德·希尔先生共同主持。

2. 出席会议情况

2.1 出现会议的有危险物品、运行、适航、安全管理体系、航空器货运消防安全研发领域的专家和机身制造商与锂电池行业的代表。与会者名单见附录C。

3. 目的和目标

3.1 航空航天工业协会国际协调理事会（ICCAIA）和航空公司驾驶员协会国际联合会（IFALPA）针对他们对锂电池航空运输风险所持的关切，向 2015 年危险物品专家组工作组会议（DGP-WG/15 会议，2015 年 4 月 27 日至 5 月 1 日，蒙特利尔）提出了建议（见附录 D 中所载 DGP-WG/15 会议报告的摘录）。此次会议上，提供了关于这些建议的背景信息。据报告称，自该工作组会议以来，两大机身制造商已向运营人发出通知，警告说涉及高密度锂电池的火灾有可能超出航空器货舱消防系统的能力。来自两大制造商的代表支持航空航天工业协会国际协调理事会和航空公司驾驶员协会国际联合会向 DGP-WG/15 会议提出的建议，其中包括在诸如采用更安全运输方式之类的时刻到来之前，禁止在客机上载运锂离子电池和电池芯的高密度包装件。两大制造商均在其通知中建议，选择将锂电池作为货物载运的运营人应执行一项安全风险评估。制造商的通知针对执行风险评估时所应考虑的事项提供了一些指导。 大家注意到，几大运营人已开始禁止运输锂离子电池。考虑到最终目标是允许通过航空运输锂电池，作为一项旨在降低锂电池所产生风险的全面战略的一部分，需要拟定包装标准等性能标准。多学科会议的一个主要侧重点是包装性能标准。

3.2 在DGP-WG/15会议上针对航空航天工业协会国际协调理事会的建议进行讨论期间，提到有必要对高密度锂电池货物进行界定（见附录D，第3.5.1.2.5段）。多学科会议承认，由于电池化学性质、货舱特性和载荷配置给热传播的潜能和力度产生的影响是可变的，所以不可能为高密度确定一种单一的可量化的测量法。因此，协调会议支持航空航天工业协会国际协调理事会和航空公司驾驶员协会国际联合会在DGP-WG/15会议上提供的解释，即“…有可能超出货舱消防系统能力的锂电池的数量”，并建议在执行安全风险评估时将此考虑在内（见附录D）。

4. 提交的文件和所做的报告

4.1 会议期间，提交了下列文件：

a) 关于锂电池航空运输的基于性能标准问题；和

b) 航空公司驾驶员协会国际联合会对通过一项锂电池货物的性能包装标准所持的立场。

4.2 会议上，做了如下报告：

a) 关于锂离子和锂金属电池芯/电池的基于性能标准的概述；和

b) 锂电池因热逸散生成的易燃气体给航空器造成的危害。

5. 性能包装标准

5.1 大家注意到，需要拟定性能标准；该标准对有必要就如何达成这些标准拟定详细说明做了权衡考虑，同时又足够一般化，从而能够在有效实施标准时有灵活性。会议拟定了高级别性能标准，可据以拟定更加详细的标准。

5.2 高级别标准

注：在方括号中放入了一些定量数据文本，表示需要做进一步考虑。

5.2.1 针对是否应考虑外燃事件对包装件的影响，没有达成一致。一些与会者认为，根据联邦航空局技术中心的测试结果，需要做出考虑；该结果表明，直接卷入由锂电池/电池芯之外的其他货物或者由受到抑制的外部火的热量所引发的火灾事件，可导致电池释放气体（见第6.4.4段）。其他与会者认为，实施针对外部火制定的标准将不切实际，并指出，没有在《技术细则》中为任何其他类型的危险物品制定此种标准的先例，因此此种标准是无根据的。

5.2.2 会上商定，下列标准适合于降低装有锂电池或电池芯的某一包装件内正在发生的火灾所带来的风险，并确定可在包装或电池/电池芯一级满足这些标准：

a) 不允许包装件外有可造成危害的火焰量；

b) 包装件外表面温度不能超过可点燃邻近包装材料或导致邻近包装件内电池或电池芯发生热逸散的温度值 [100°C]；

c) 不能从包装件内掉出可造成危害的碎片，包装必须保持结构完好；和

d) 易燃蒸气的数量不得超过如与空气混合且点燃，则可导致在 [2.83 m^3] 的体积内形成一个能使货舱内的过压板移位或造成货机损坏的压力脉冲 [3.45 kPa] 的气体量。

注：[2.83 m^3] 的体积代表一架货物装载系数为70%的737-200航空器的前部货舱内的空余体积，一旦着火，该空余体积可导致形成一个根据机身制造商的规范，能使货舱内的过压板移位或损坏货机的压力脉冲 [3.45 kPa]。

可假设，包装件外释放的烟雾可不予考虑，只要该事件可控制在包装件以内。

6. 临时建议

6.1 注意到拟定性能标准可花费几年时间，请会议对运营人作为风险降低措施的一部分可能考虑采取的临时措施进行审议。会上强调有必要制定一项多层次的风险降低战略。

6.2 会议建议运营人执行一项安全风险评估，以确定他们能否对使用客机或全货航空器对锂电池进行货运的相关风险进行管控，使之处于一个可接受的安全水平。为了执行安全风险评估，需要对正在运输的锂电池和电池芯的型号和数量信息进行考虑。在锂电池失火事件中，消防系统的应对能力非常有限，这点也需要考虑在内。

6.3 会议还建议为运营人和监管者就如何开展和评价一项安全风险评估活动拟定相关指导。

6.4 风险降低措施

6.4.1 建议采取一些风险降低措施，包括在降低荷电状态的情况下运输锂离子电池和引入额外的货物装载管制措施。

降低荷电状态

6.4.2 联邦航空局技术中心的测试结果表明，在荷电状态降低至30%时接受测试的电池芯，大多数均没有发生热逸散的传播。但是，电池行业的代表却报告说，30%的荷电状态并不适合所有的电池类型，而且如果不在很短时间内将电池从始发地运送至目的地，则将荷电状态降至该水平可带来新的安全风险，因为他们的测试结果表明，某些电池芯和电池在荷电状态较低时可能出现电池芯降解。尽管如此，会上却商定，以较低的荷电状态运输锂离子电池可成为一种降低某些电池芯和电池所产生风险的有效措施，但承认难以对此类措施进行监管和监督。

货物装载管制措施

6.4.3 所建议的其他临时措施包括采取额外的货物装载管制措施，如限制某一位置所装电池数量并将它们与其他危险物品隔离开。考虑到按照锂电池包装说明第II部分装运的电池并不是进行全面申报的危险品，会上提到了对这些电池实施此类措施的可行性。同样，非法申报和有意无意误报的锂电池也影响着实施此类措施的可行性。在讨论安全风险评估和风险降低措施及运营人在不知道正在交运的电池的数量或类型的情况下能否执行有效评估并实施有效风险降低措施时，还提到了根据第II部分装运的电池和误报/未申报的电池这一主题。

6.4.4 将锂电池装入耐火的防火盖或配备有灭火系统的集装器中，被视为另外一种潜在的风险降低措施，但联邦航空局技术中心的测试结果表明，从释放气体的锂离子电池芯内释放出的易燃气体有可能聚集、点燃和导致密闭舱内发生爆炸，需对此测试结果进行考虑。联邦航空局技术中心所做的进一步测试表明，从8节18650电池芯中释放的气体足以导致此种情况。但报告中称，为货运航空器建造耐火防火盖和集装器这一新的发展正在表明有可能安全地控制住锂离子电池芯的危害。

7 结论

7.1 会议得出结论认为，需要基于会议上概述的高级别标准（见第5.2段）拟定详细的性能标准。国际民航组织工作组或外部标准制定组织是否应拟定这些详细标准，将需要由国际民航组织确定。与此同时，运营人应执行一项安全风险评估，以确定在收运锂电池之前，能否将利用客机或货机对锂电池进行货运所带来的相关风险降低，以达到一个可接受的安全水平（见第6.2段）。

7.2 机身制造商代表陈述说，在确定和实施更加安全的锂电池安全运输条件之前，在其发给运营人的通知及向其提供的建议中提到的关切将一直存在。将根据他们的建议，向第二十五次危险物品专家组会议（DGP/25会议，2015年10月19日至30日，蒙特利尔）提交一份正式提议。来自航空公司驾驶员协会国际联合会（IFALPA）的一位代表重复了这一陈述。

7.3 此次会议的报告将提供给危险物品专家组、飞行运行专家组（FLTOPSP）和适航专家组（AIRP）。

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Appendix A
English only

APPENDIX A

LETTER OF INVITATION

Tel.: +1 514 954-8080

Ref.: AN 11/2.12 – ANB/SAF/OPS

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Dear [Name],

I wish to inform you that the International Civil Aviation Organization (ICAO) will convene the Third International Multidisciplinary Lithium Battery Transport Coordination Meeting from 28 to 30 July 2015 at ICAO Headquarters in Montréal, Canada.

The purpose of this meeting will be to continue the work from the recent ICAO Dangerous Goods Panel Working Group Meeting (DGP-WG/15), held from 27 April to 1 May 2015, in Montréal, Canada. Working Paper 4, presented by the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and the International Federation of Airline Pilots' Association (IFALPA), facilitated discussion on continuing concerns that existing cargo compartment fire protection systems, as currently certified, are not capable of suppressing or extinguishing a fire involving certain types and quantities of lithium batteries (Attachment A refers).

The ICCAIA recommendations, which IFALPA endorsed, were:

e) that appropriate packaging and shipping requirements be established to more safely ship lithium ion batteries as cargo on passenger aircraft;

f) that high density packages of lithium ion batteries and cells (UN 3480) not be transported as cargo on passenger aircraft until such time as safer methods of transport are established and followed; and

g) that appropriate packaging and shipping requirements be established to more safely ship lithium metal and lithium ion batteries as cargo on freighter aircraft.

Recognizing these safety concerns and Recommendations 2/14, 3/14 and 8/14 from the Second ICAO International Multidisciplinary Lithium Battery Meeting (reproduced in Attachment B), the DGP-WG/15 fully supported the need to develop performance-based Standards founded on the principle that hazardous effects from the batteries would be contained within the package. The DGP-WG/15 also determined the need for an informal working group to address these recommendations specifically and developed Terms of Reference (see Attachment C). An extract from the report of the DGP-WG/15 Meeting is presented in Attachment D.

ICAO has determined that the most effective means to address the recommendations of the ICCAIA and related recommendations from the Second ICAO International Multidisciplinary Lithium Battery Meeting as well as the DGP's request for an informal working group is to call a third meeting of

the multidisciplinary group. This initiative will, in addition, begin to address the request of the Air Navigation Commission to develop a comprehensive strategy for the carriage of lithium batteries on both passenger and cargo aircraft.

Accordingly, the Third International Multidisciplinary Lithium Battery Transport Coordination Meeting will consider Recommendations 2/14, 3/14 and 8/14 from the Second International Multidisciplinary Lithium Battery Transport Coordination Meeting with particular emphasis on the development of a Standard for performance-based packaging for lithium batteries. This will be through input from experts in the fields of dangerous goods, safety management, operations and airworthiness (particularly aircraft cargo compartment fire safety) and from representatives of the aircraft and battery manufacturing industries. The report of the meeting will be submitted to the DGP for their consideration at the Twenty-fifth Meeting of the Panel (Montréal, 19 to 30 October 2015) and to the Flight Operations and Airworthiness Panels, for their information, and action if appropriate.

Noting the multidisciplinary nature of the meeting and that your State has experts on the Airworthiness, Dangerous Goods and/or Flight Operations Panels, I would like to extend an invitation and ask that you select appropriate representatives to attend this meeting. Please confirm by e-mail at ops@icao.int by **3 July 2015**.

Further details of the meeting, which will be conducted in English, together with the agenda will be circulated shortly. The ICAO focal point will be Mr. John Illson, Chief, Operational Safety Section. Should you require further information, please contact his office by e-mail at ops@icao.int.

I wish to thank you for your support and look forward to your active participation in this event.

Yours sincerely,

Stephen P. Creamer
Director
Air Navigation Bureau

Enclosures:

A — DGP-WG/15-WP/4
B — Extract of Recommendations of the Second International Multidisciplinary Lithium Battery Transport Coordination Meeting
C — Terms of Reference
D — Extract from DGP-WG/15 Report

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Appendix B
English only

APPENDIX B

AGENDA

THIRD INTERNATIONAL MULTIDISCIPLINARY LITHIUM BATTERY TRANSPORT COORDINATION MEETING

Montréal, Canada, 28 to 30 July 2015

Day 1 – Tuesday, 28 July 2015	
0900 – 0920	• Welcome and introduction
0920 – 0940	• Overview of goals and objectives o Develop way forward based on: ▪ Recommendations from the second meeting ▪ ICCAIA recommendations
0940 – 1030	• Discuss interim recommendations o Passenger aircraft ban o State of charge o Cargo loading controls/other
1030 – 1050	***Coffee Break***
1050 – 1230	• Continue discussion
1230 – 1400	***Lunch Break***
1400 – 1520	• Discuss the bounds (scope) of a performance packaging standard o Define densely packaged o Discuss potential impact on Section 2 and any other UN standards
1520 – 1540	***Coffee Break***

1540 – 1700	• Continue discussion

Day 2 – Wednesday, 29 July 2015	
0900 – 1030	• Discuss performance packaging standard o Containment of thermal runaway in package ▪ Containment pass/fail ▪ Battery state of charge ▪ Non-propagating cells
1030 – 1050	***Coffee Break***
1050 – 1230	• Continue discussion
1230 – 1400	***Lunch Break***
1400 – 1520	• Continue discussion
1520 – 1540	***Coffee Break***
1540 – 1700	• Discuss performance packaging standard o External fuel fire requirement o Alternate means of compliance

Day 3 – Thursday, 30 July 2015	
0900 – 1030	• Continue discussion on external fuel fire requirement
1030 – 1050	***Coffee Break***
1050 – 1230	• Discuss system safety assessment for cargo aircraft
1230 – 1400	***Lunch Break***
1400 – 1520	• Develop recommendations regarding: o Any short term/interim action o Performance packaging standard o System safety assessment
1520 – 1540	***Coffee Break***
1540 – 1700	• Continue development of recommendations

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Appendix C
English only

APPENDIX C

LIST OF ATTENDEES

STATE/ORGANIZATION	NAME OF ATTENDEE	E-MAIL ADDRESS
BRAZIL	Paulo Fabrício Macário	paulo.fabricio@anac.gov.br
CANADA	France Bernier	france.bernier@tc.gc.ca
CANADA	Marc Casas Cordero	marc.casas-cordero@tc.gc.ca
CHINA	Pui Shan (Candy) Chan	candy_chan@cathaypacific.com
CHINA	Chunyu Ding	cding@icao.int
JAPAN	Hiromitsu Sugimoto	sugimoto-h2vt@mlit.go.jp
JAPAN	Hajime Yoshimura	HYoshimura@icao.int
SINGAPORE	Alan Foo	afoo@icao.int
SINGAPORE	Nicholas Lum	NLum@icao.int
UNITED KINGDOM	Ian Bryer	ian.bryer@vca.gov.uk
UNITED KINGDOM	Ross McLachlan	ross.mclachlan@caa.co.uk
UNITED STATES	Jeff Gardlin	jeff.gardlin@faa.gov
UNITED STATES	Shane Kelley	shane.kelley@dot.gov
UNITED STATES	Kevin Leary	kevin.leary@dot.gov
UNITED STATES	Janet McLaughlin	Janet.McLaughlin@faa.gov
UNITED STATES	Timothy Shaver	Tim.shaver@faa.gov
EASA	Enzo Canari	enzo.canari@easa.europa.eu
FAA TECH CENTRE	Richard Hill	richard.hill@faa.gov
FAA TECH CENTRE	Harry Webster	harry.webster@faa.gov
FEDEX	Mark Petzinger	mrpetzinger@fedex.com
GEA	Alex McCulloch	alex.mcculloch@europe.ups.com
IATA	Dave Brennan	Brennand@iata.org
IATA	Mike Comber	comberm@iata.org
IATA	Patrick Oppenheimer	pat.oppenheimer@fedex.com
IATA	Rodolfo Quevedo	quevedor@iata.org
IATA	Marc Stumboeck	marc.stumboeck@dlh.de
ICCAIA	Doug Ferguson	douglas.e.ferguson@boeing.com
ICCAIA	Paul Rohrbach	Paul.Rohrbach@airbus.com

STATE/ORGANIZATION	NAME OF ATTENDEE	E-MAIL ADDRESS
IFALPA	Mark Rogers	dgchair@ifalpa.org
IFALPA	Scott Schwartz	scott.schwartz@alpa.org
PRBA/NEMA	Marcus Boolish	marckboolish@energizer.com
PRBA/NEMA	Claude Chanson	cchanson@rechargebatteries.org
PRBA/NEMA	George Kerchner	Gkerchner@wileyrein.com
PRBA/NEMA	Celina Mikolajczak	celinam@teslamotors.com
PRBA/NEMA	Kathleen O'Shei	koshei@greatbatch.com
PRBA/NEMA	Craig Updyke	Craig.Updyke@Nema.org
UPS	Keith Stehman	kstehman@ups.com
ICAO	Henry Defalque	HDefalque@icao.int
ICAO	Elizabeth Gnehm	EGnehm@icao.int
ICAO	John Illson	jillson@icao.int
ICAO	Lynn McGuigan	LMcGuigan@icao.int
ICAO	Katherine Rooney	KRooney@icao.int
ICAO	Shyh Syaun Sebastian Wong	SWong@icao.int
ICAO	Rosa Tajes	rtajes@icao.int
ICAO	Yusuke Urano	yurano@icao.int

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Appendix D
English only

APPENDIX D

EXTRACT FROM DGP-WG/15 REPORT

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3.5.1.2.1 **Transport of Lithium Batteries as Cargo via Air (DGP-WG/15-WP/4 and DGP-WG/15-WP/33)**

3.5.1.2.1.1 Continued concerns with respect to cargo compartment fire protection, particularly in relation to the carriage of high density packages of lithium batteries as cargo, were raised by the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and the International Federation of Air Line Pilots' Associations (IFALPA). Recommendations for addressing these concerns were presented to the working group.

3.5.1.2.1.2 ICCAIA's position was that the fire protection capabilities and certification of original equipment manufacturers' (OEMs) airframes and systems were developed considering the carriage of general cargo and not the unique hazards associated with the carriage of dangerous goods, including lithium batteries. Test data was cited which identified that existing cargo compartment fire protection systems certified to European and American regulations were unable to suppress or extinguish a fire involving significant quantities of lithium batteries, resulting in reduced time for safe flight and landing of an aircraft to a diversion airport.

3.5.1.2.1.3 Concerns related to lithium battery hazards included:

a) the inability of packaging currently required by the Technical Instructions to contain a lithium battery fire or to prevent the propagation between adjacent packages of batteries;

b) the potential for an uncontrolled lithium battery fires to negate the capability of current aircraft cargo fire protection systems, leading to a catastrophic failure of the airframe; and

c) new test results from the Federal Aviation Administration (FAA) William J. Hughes Technical Centre (FAA Tech Centre) which demonstrated the potential for electrolyte gases exhausted during the propagation of both lithium metal and lithium ion batteries to create an explosive atmosphere regardless of the presence of Halon when contained inside an enclosed space such as a unit load device or cargo compartment.

3.5.1.2.2 Applying the safety risk model provided in the *Safety Management Manual (SMM)* (Doc 9859) (hereafter referred to as the "Safety Management Manual"), the presenters determined that immediate action to mitigate the unacceptable risks posed by lithium batteries was necessary.

3.5.1.2.3 The ICCAIA recommendations, which IFALPA endorsed, were:

a) that appropriate packaging and shipping requirements be established to more safely ship lithium ion batteries as cargo on passenger aircraft;

b) that high density packages of lithium ion batteries and cells (UN 3480) not be transported as cargo on passenger aircraft until such time as safer methods of transport were established and followed; and

c) that appropriate packaging and shipping requirements be established to more safely ship lithium metal and lithium ion batteries as cargo on freighter aircraft.

3.5.1.2.4 A separate working paper submitted by IFALPA recommended extending the restriction in sub-paragraph b) above to all-cargo aircraft. It was stated that while lithium ion batteries were carried as cargo on both passenger and cargo aircraft, the majority of large shipments were transported on cargo aircraft. This, combined with the fact that cargo aircraft were not required to be outfitted with cargo compartments having an active fire suppression system, made the risk to cargo aircraft even greater than to passenger aircraft. It was argued that the principles in the Safety Management Manual for States to develop practices to ensure the safe operation of aircraft did not distinguish between passenger and cargo aircraft. For this reason, IFALPA also recommended that the current prohibition on UN 3090 — **Lithium metal batteries** from transport on passenger aircraft be extended to all-cargo aircraft.

3.5.1.2.5 Clarification on what was meant by the term “high density” was sought during discussion of the working paper. It was explained that high density was meant to describe quantities of lithium batteries which had the potential to overwhelm the cargo compartment fire protection features. The outcome of a thermal runaway event had been demonstrated to be variable depending on battery chemistry, cargo compartment characteristics, and loading configurations. Tests had demonstrated that some configurations with an accumulation of packages containing less than 5 kg each of 18650 lithium ion cells had the potential to lead to significant or catastrophic damage of an aircraft. Quantifying a limitation for “high density” that would apply to every situation was therefore impossible. It was suggested that the inability to determine a safe limit for every situation was the reason that several large operators had recently introduced complete bans on the transport of lithium ion batteries as cargo.

3.5.1.2.6 A question was raised in relation to how the ICCAIA determined that the likelihood of a cargo fire involving lithium batteries was “occasional” when conducting their risk assessment. Others also questioned this value, suggesting that a large number of lithium battery incidents involved undeclared or non-compliant batteries. It was explained that the value was based on reports of three aircraft accidents involving lithium batteries which supported the description for “occasional” provided in Doc 9859 as an event that occurred infrequently. It was stressed that the likelihood was not based solely on a lithium battery *causing* a fire, it was based on the potential for a lithium battery to be *involved* in a fire.

3.5.1.2.7 Another panel member expressed concern that many of the operators he spoke to within his State had not undertaken a risk assessment on the likely consequences and impacts before imposing a prohibition. A team in his State had conducted their own risk assessment on the transport of lithium metal and ion batteries. Their findings were that the risks were heightened either from hidden dangerous goods which included lithium batteries which could become the source of a fire or from other dangerous goods which could cause a fire and threaten the shipment of declared batteries. He suggested that a ban on lithium batteries would have the unintended consequence of more undeclared shipments of lithium batteries and therefore result in an increased risk. Some expressed disagreement with the notion that a large number of people or organizations would break the law and continue to ship batteries if they were banned. They reported that data from their States indicated that the percentage of deliberate non-

compliance was low. The Secretary reminded the working group of the need for data. She emphasized that the ANC and the Council had become increasingly concerned when arguments were made without data to substantiate them.

3.5.1.2.8 The idea that undeclared and mis-declared lithium batteries were a risk was not disputed by anyone; however, those not supporting the notion that a prohibition would increase non-compliance and therefore the risk stressed that the potential for a suppressed fire being an ignition source for batteries to go into thermal runaway applied to all batteries regardless of whether or not they were compliant. They deemed the continued allowance of unrestricted quantities of even compliant lithium batteries in cargo compartments knowing that a fire could exceed the capabilities of the fire protection system to be unacceptable.

3.5.1.2.9 Those who supported the need for immediate action to mitigate the risks emphasized that their goal was not to ban the transport of lithium batteries permanently but rather to find a way to transport them safely. Recognizing the need for a layered approach towards mitigation, it was suggested that coordination with the Flight Operations (FLTOPSP) and Airworthiness Panels (AIRP) would be necessary to accomplish this. The Secretariat was asked to provide feedback on how this could be accomplished. She noted that the information contained in DGP-WG/15-WP/4, including the position of ICCAIA and IFALPA, had been provided to FLTOPSP and AIRP. Both panels were also provided with the recommendations developed by the Second International Multidisciplinary Lithium Battery Transport Coordination Meeting (Cologne, Germany, 9 to 11 September 2014 (subsequently referred to as the Second Multidisciplinary Lithium Battery Meeting or Multidisciplinary Meeting)). She would be providing the DGP with feedback from both panels once she had received it.

3.5.1.2.10 Although there was disagreement on the level of risk posed by fully compliant shipments of lithium batteries, there were no objections to the problem statement developed by the Multidisciplinary Meeting which affirmed that a fire involving significant quantities of lithium batteries (UN 3090 and UN 3480) could exceed the fire suppression capability of the aircraft and could lead to a catastrophic failure of the air frame. The working group fully supported the need to develop performance-based standards based on the principle that hazardous effects from the batteries would be contained within the package. Terms of reference for a group of experts made up of all interested parties were developed. The group was tasked with providing subject matter expertise on aircraft cargo compartment fire safety and the safe transport of lithium batteries in aircraft. The terms of reference are provided in Appendix D to this report. They were developed with the aim of allowing for a flexible solution that would address the varying degree of risks posed by different battery types and sizes. The Secretary asked that DGP members indicate their interest in attending such a meeting. It was noted that a multidisciplinary approach employing a layered mitigation approach was necessary to address risks posed by lithium batteries. This would involve focusing on the source of the threat (battery) and expanding outward (i.e. packaging, cargo unit load device, cargo compartment, aircraft). For this reason, the Secretary noted participation from FLTOPSP and AIRP members would be essential

3.5.1.2.11 Recognizing that the joint ICCAIA/IFALPA working paper recommended that high density packages of lithium ion batteries and cells should not be transported as cargo on passenger aircraft until such time as safer methods of transport were established and followed, the working group was asked to indicate their level of support for this recommendation. The member nominated by IFALPA reminded the group that his organization recommended extending this prohibition to cargo aircraft for lithium ion batteries and to also impose a prohibition on lithium metal batteries on cargo aircraft. Some panel members, while not opposing the joint recommendation, were unable to support it on the basis that it had not been identified as a formal proposal in accordance with standard DGP procedures, and therefore there had been insufficient time to conduct the necessary consultation with relevant experts within their States.

Some of these members reiterated the argument that a prohibition would only increase the number of undeclared shipments and also stated that they could not support a proposal referring to high density packages without a clear definition for the term. The IFALPA/ICCAIA representatives repeated that it was impossible to determine a quantitative limit for high density that would apply to every situation because of the number of variables involved. These included differing battery chemistries, differing characteristics of cargo compartments, and differing loading configurations. This was exacerbated by the fact that there was no way to control the number of packages of Section II batteries loaded on the aircraft.

3.5.1.2.14 The IFALPA representative expressed disappointment with the lack of support for the recommendations of his organization and of the ICCAIA. Representatives of both organizations indicated that a formal proposal would be developed for DGP/25 which would allow adequate time for consultation with States. Both organizations would participate fully in the working group on performance-based packaging standards and would ensure that their proposal would take the recommendations of that working group into account. The ICCAIA representatives acknowledged the concerns raised in relation to the lack of a quantifiable definition for high-density packages and offered to work on further refinement of the concept for consideration at DGP/25.

3.5.1.2.13 Dates and a venue for the working group tasked with performance-based packaging standards for the safe transport of lithium batteries by air would be determined by the Secretariat in the near-term through coordination with the members involved.

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