



DANGEROUS GOODS PANEL (DGP)

TWENTY-SIXTH MEETING

Montréal, 16 to 27 October 2017

Agenda Item 6: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel:

6.3: Mitigating risks posed by the carriage of lithium batteries by air (*Job card DGP.003.01*)

HAZARD-BASED SYSTEM FOR CLASSIFICATION OF LITHIUM BATTERIES

(Presented by the Secretary)

SUMMARY

This information paper provides an update on work being undertaken by the UN Sub-Committee of Experts on the Transport of Dangerous Goods with respect to the classification of lithium batteries.

1. ICAO submitted a working paper to the forty-ninth session of the UN Sub-Committee of Experts on the Transport of Dangerous Goods (Geneva, 27 June to 6 July 2016) outlining decisions made by the Council with respect to the prohibition on the transport of UN 3480 — **Lithium ion batteries** as cargo on passenger aircraft and the additional restrictions applied to both UN 3480 and 3090 — **Lithium metal batteries** when transported in accordance with Section II of Packing Instructions 965 and 968. The Sub-Committee was advised that prohibiting the transport of lithium ion batteries as cargo on passenger aircraft was intended as a temporary measure until controls were in place which established an acceptable level of safety. The lack of a mechanism to identify and communicate the specific hazards and safety risks associated with each battery and cell type offered for transport to the air operator was cited as one of the factors that contributed to the Council's decision to ban all batteries. ICAO had therefore expressed to the Sub-Committee the need for establishing greater granularity with respect to the classification of different lithium cell and battery types. The Sub-Committee noted ICAO's concerns and acknowledged that the behaviour of lithium batteries in a fire was difficult to predict solely on the basis of their lithium content or energy ratings. A classification based on tests, as was the case for goods of Class 1, was suggested as a way to better define the actual dangers posed by the various types of cells, according to their design (see Appendix A for an extract from the report of the 49th Session of the UN Sub-Committee).

1.1 ICAO submitted another working paper to the fiftieth session of the Sub-Committee (Geneva, 28 November to 6 December 2016) advising that it was continuing its work to address problems related to the specific requirements of transporting lithium batteries by air but wanted the Sub-Committee

to consider establishing greater granularity with respect to the classification of different lithium cell and battery types and addressing the risks posed by non-compliant shipments. The Sub-Committee agreed to include a specific item in its programme of work on the subject. It agreed to break the work into two stages. The first stage would consist of developing an entirely new system of criteria based on the intrinsic hazards posed by the various types of cells and batteries. The second stage would consist of determining the corresponding conditions of transport and would begin once the criteria were established (see Appendix B for an extract from the report of the 50th Session of the UN Sub-Committee).

1.2 The Sub-Committee subsequently re-established an informal working group on lithium batteries and mandated the group to consider a hazard-based system to classify lithium batteries and cells for transport. The first meeting of this group was hosted by ICAO at Headquarters from 27 to 29 March 2017. The goal of that meeting was to determine what information was needed to meet the intended goals. A draft table outlining hazardous effects that should be considered as part of the classification process was developed and discussions on how these hazards could be assessed and classified were initiated. The report of the meeting was presented to the 51st Session of the Sub-Committee (Geneva, 3 to 7 July 2017) and is available on the United Nations Economic Commission for Europe (UNECE) website (ST/SG/AC.10/C.3/2017/16, www.unece.org/trans/main/dgdb/dgsubc3/c32017.html). It was agreed that further meetings of the informal working group would take place in the second half of 2017 in order to start consideration of the potential hazardous effects (see Appendix C for an extract from the report of the 51st Session of the UN Sub-Committee).

APPENDIX A

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS
GOODS ON ITS FORTY-NINTH SESSION
(Geneva, 27 June to 6 July 2016)

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D. Miscellaneous

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2. Prohibition on the transport of lithium ion batteries as cargo on passenger aircraft and additional mitigation measures for cargo aircraft

Document: ST/SG/AC.10/C.3/2016/39 (ICAO)

72. The Sub-Committee noted the concerns of ICAO related to the fact that aircraft fire protection systems were apparently unable to suppress fires involving lithium battery cargos. ICAO had consequently decided to temporarily strengthen the regulations by prohibiting the transport of lithium-ion cells on passenger aircraft and making the rules applicable on board cargo aircraft more stringent.

73. The decision by ICAO gave rise to a long discussion, as the Sub-Committee wanted to help ICAO find a solution to the identified problems. In particular, it was noted that the behaviour of lithium batteries in a fire was difficult to predict solely on the basis of their lithium contents or energy ratings. The behaviour in a fire was largely dependent upon the design of the batteries and packages, and the suggestion was made to consider drawing up a classification, by types of cells and batteries. Depending on the design, there may be just ignition, or a significant emission of hot gases, or a serious emission of potentially toxic gases, or even an explosion. A classification based on tests, as was the case for goods of Class 1, could better define the actual dangers posed by the various types of cells, according to their design. The expert from France said that he would present the Sub-Committee with a study carried out on the subject in his country.

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APPENDIX B

**REPORT OF THE SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS
GOODS ON ITS FIFTIETH SESSION**

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D. Electric storage systems

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7. The safe transport of lithium batteries by air

Document: ST/SG/AC.10/C.3/2016/84 (ICAO)

Informal documents: INF.22 (RECHARGE)
INF.31 and Add.1 and 2 (France)

48. The Sub-Committee noted that ICAO was continuing its work to address problems related to the specific requirements of air transport and had expressed the desire to work with the Sub-Committee specifically on:

- (a) establishing greater granularity with respect to the classification of different lithium cell and battery types;
- (b) addressing the risks posed by non-compliant shipments..

49. The Sub-Committee agreed to follow up on the request from ICAO and to include a specific item in its programme of work. It would, however, be necessary to proceed in stages. The first stage would consist in developing an entirely new system of criteria based on the intrinsic hazards posed by the various types of cells and batteries. In that connection, the Sub-Committee welcomed the work already done by France, as described in informal documents INF.31 and Add.1 and 2, in particular the two studies performed by INERIS (INF.31/Add.1, Opportunity of having a classification system for the transport of batteries, basic specifications for a testing programme; and INF.31/Add.2, Comparison of thermal and toxic effects of the fire of batteries and other goods in transport by a heavy goods vehicle). In the second stage, once the criteria were established, it would be possible to determine the corresponding conditions of transport (see also under item 8, Programme of work for the biennium 2017-2018).

50. The Sub-Committee reaffirmed its commitment to addressing concerns expressed by ICAO, specifically to working with ICAO more closely to address this important agenda item including Sub-Committee involvement within ICAO Dangerous Goods related meetings.

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APPENDIX C

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS ON ITS FIFTY-FIRST SESSION

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B. Hazard-based system for classification of lithium batteries

Document: ST/SG/AC.10/C.3/2017/16 (France)

Informal documents: INF.3 (France)
INF.26 (France)
INF.45 (Report of the lunchtime Working
Group)

44. After discussion in plenary, the documents submitted by France on behalf of the informal working group on hazard-based system for classification of lithium batteries were referred to a lunchtime working group, which submitted its report as informal document INF.45.

45. The Sub-Committee approved the report of the working group and the proposed schedule for future work as follows:

- (a) The expert from France would host a meeting of a small group of interested delegates who have data on lithium battery tests and are willing to organize and present such existing test data. Potential participants would be experts from OICA, RECHARGE, PRBA, France (INERIS), the United States of America. This group would meet in time in September or October 2017 to provide data that could be made available to the Sub-Committee at its next session. The test data to be provided should be as described in INF.45.
- (b) These data will be considered at the next session of the informal working group on lithium battery that will be hosted by RECHARGE in Geneva from 6-8 December 2017.

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