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WORKING PAPER

DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING (DGP-WG/24)

Montreal, 21 to 25 October 2024

Agenda Item 4: Managing safety risks posed by the carriage of lithium batteries by air (Ref: Job Card DGP.003.05)

LITHIUM BATTERY(IES) THAT REMAIN INSTALLED IN MOBILITY AIDS

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SUMMARY

This working paper invites the panel to consider addressing the safety challenges posed by lithium-ion battery-powered mobility aids used by passengers with reduced mobility, where the batteries remain installed during air transport (see Part 7; 2.13.3.2 b) 2) c) of the Technical Instructions).

Action by the DGP: Action by the DGP is in paragraph3.

1. INTRODUCTION

1.1 At the 2023 Working Group Meeting of the Dangerous Goods Panel (DGP-WG/23, Rio de Janeiro, 15 to 19 May 2023), a proposal to amend Part 7;2.13.3.2 b) 2) and c) and Table 8-1 (Provisions for dangerous goods carried by passengers and crew) of the Technical Instructions was agreed. This amendment included incorporating a note clarifying that there is no Watt-hour limit for mobility aids carried by passengers, provided the battery(ies) remain installed in the aid.

1.2 The 2013–2014 Edition of the Technical Instructions introduced a 300 Watt-hour limit for lithium-ion battery(ies) that are removed from mobility aids. The current regulatory framework outlined in Part 7;2.13.3.2 b) 2) c) and Table 8.1 of the Technical Instructions does not impose specific limits or safety standards for lithium-ion battery(ies) that remain installed in mobility aids carried by passengers. The aviation industry notices that the Watt-hour limit of lithium-ion battery(ies) is increasing, as innovation in battery technology enables higher-capacity batteries to be integrated into these aids. The increased density of these batteries, combined with the uncertainty regarding their handling, poses a significant safety risk. If these batteries enter thermal runaway, the consequences could be severe. Since there are no restrictions on the Watt-hour limit, it is the operator's responsibility to decide through a safety risk assessment in conformity with Part 7;1.1.7 of the Technical Instructions if the mobility aid can be accepted and is safe for transport. These innovative and advanced lithium-ion battery(ies) create safety challenges for the operator

and uncertainty for passengers with reduced mobility, who are subject to different policies from operators when accepting mobility aids with installed lithium-ion battery(ies). To address these issues, the DGP is requested to consider for discussion the proposals described in paragraph 3.

2. OPERATOR'S RESPONSIBILITIES AND PASSENGER RIGHTS

2.1 The transport of lithium-ion battery-powered mobility aids by passengers presents a challenge for the aviation sector. This is due to the conflict that arises between the responsibility of operators for ensuring the safety of passengers and crew on the one hand and upholding the accessibility rights of passengers with reduced mobility on the other. The definition of passengers with reduced mobility is understood to be any person whose mobility is reduced due to a physical incapacity (sensory or locomotor), an intellectual deficiency, age, illness or any other cause of disability when using transport and whose situation needs special attention and the adaptation to the person's needs of the services made available to all passengers. [1]. The absence of a standardized definition of mobility aids allows for broad interpretation and determining which mobility aids a passenger requires during air transport, and therefore must be transported by air, becomes challenging.

2.2 ICAO Annex 9 — *Facilitation*, Chapter 8, paragraph H — Facilitation of the transport of persons with disabilities requires that Contracting States take the necessary steps to ensure that persons with disabilities have equivalent access to air services. European and American regulation specify that mobility aids shall be transported by the operator without further costs, provided that the request to transport the mobility aid is issued at least 48 hours before departure and in compliance with the international regulations for the safe transport of dangerous goods[2]. The assertion that operators cannot refuse to transport battery-powered mobility aids, as it would violate passengers' fundamental right to accessible air travel, may therefore be too strong a conclusion. It is stated that nothing contained in Part 7 of the Technical Instructions should be interpreted as requiring an operator to transport a particular article or substance or as preventing an operator from imposing special requirements on the transport of a particular article or substance[3]. The operator retains the right to deny the transport of battery-powered mobility aids based on a risk assessment; however, this decision can lead to significant reputational and legal consequences. Examples of these consequences include airlines facing fines and legal actions initiated by passengers with reduced mobility and/or organizations representing their interests after denial of boarding.

2.3 The DGP-WG is invited to discuss the safety challenges created by the transport of mobility aids powered by lithium-ion battery(ies) which remain installed in these aids and is requested to consider an appropriate way forward to address these challenges. To facilitate this process, four draft proposals are presented for discussion in the appendix. After receiving feedback from the panel on the preferred way forward, a renewed proposal shall be submitted to the DGP-WG/25, including a proposed amendment to the Technical Instructions for incorporation in the 2027–2028 Edition.

[1] Definition for "person with disabilities" contained in ICAO Annex 9 — *Facilitation*, Chapter 1 — Definitions.

[2] EU Regulation 1107/2006, Annex I Assistance by air carriers I United States Air Carrier Access Act (ACAA).

[3] Technical Instructions, Part 7; Introductory Notes, Note 3.

3. ACTION BY THE DGP-WG

3.1 The DGP is invited to:

a) acknowledge the complexities and challenges involved in ensuring the safe air transport of mobility aids with installed lithium-ion batteries; and

b) discuss the options to improve the safe transport of mobility aids with installed lithium-ion batteries presented in the appendix to this working paper.

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APPENDIX

FOUR DRAFT PROPOSALS TO ADDRESS SAFETY RISKS ASSOCIATED WITH BATTERY-POWERED MOBILITY AIDS

1. PANEL'S CONSIDERATIONS ON THE TRANSPORT OF LITHIUM-ION BATTERY(IES)

1.1 At twenty-ninth meeting of the Dangerous Goods Panel (DGP/29), the panel agreed to recommend that lithium ion batteries contained in equipment meeting the requirements of either Section I or Section II of Packing Instruction 967 be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. It also agreed to add the same note that was added to Packing Instructions 965 and 966 indicating that cells and batteries shipped at a reduced state of charge were less prone to thermal runaway. The panel's decision was supported by the results from the system theoretic process analysis (STPA) conducted by the DGP Working Group on Energy Storage Devices, which evaluated the safety of the transport of lithium-ion batteries packed with equipment and contained in equipment. The panel considered that batteries contained in equipment imposed a lesser risk in comparison with batteries packed on their own, because of the protection provided by the equipment, the smaller energy densities and a reduced risk of thermal runaway.

1.2 The panel also agreed at DGP/29 that vehicles powered by lithium-ion batteries with a Watt-hour rating in excess of 100 Wh could only be offered for transport with the battery(ies) at a state of charge not exceeding 30 per cent of their rated capacity, or alternatively, with an indicated battery capacity not exceeding 25 per cent.

2. PROPOSAL 1: STATE OF CHARGE REQUIREMENT

2.1 The first proposal is to apply the conditions of Packing Instruction 952 for the new entry UN 3556 — **Vehicle, lithium ion battery powered** to Table 8-1 (Provisions for dangerous goods carried by passengers and crew) of the Technical Instructions. Consequently, this would mandate that the battery(ies) which remain installed in the electrical mobility aid and offered for transport by passengers, must only be transported with the battery(ies) at a state of charge not exceeding 30 per cent of their rated capacity or an indicated battery capacity not exceeding 25 per cent.

2.2 The main advantage of implementing a reduced state of charge requirement for the operator is that the hazards associated with transporting these mobility aids can be significantly reduced. Arguments that support this are the reduced risk of thermal runaway, enhanced fire containment and improved battery stability[4]. Furthermore, this requirement could increase the likelihood that operators will accept mobility aids in a smoother and practical manner, potentially reducing the number of denied boardings worldwide. However, the state of charge requirement also presents certain challenges, particularly in terms of operational difficulties for both operators and passengers with reduced mobility. One significant issue is

[4] ICAO DGP/29-WP/42, para. 4.1.3.7.

that some mobility aids do not have a display which clearly indicates the capacity of the battery, and this may complicate the process of acceptance in compliance with applicable conditions.

3. PROPOSAL 2: MANUFACTURER'S BATTERY TEST SUMMARY

3.1 The second proposal is to require that passengers with reduced mobility provide the operator, during the approval process, with a test summary from the manufacturer of the mobility aid indicating that the lithium-ion battery(ies) are compliant with the UN Manual of Tests and Criteria, Section 38.3.

3.2 Currently, operators request general information from the passenger about the mobility aids' model, battery, weight, and size. Although operators may request further information on the testing of the battery(ies), this is not always common practice. The advantage of requiring the manufacturers' test summary from passengers with reduced mobility as part of the approval process is that the operator receives confirmation that the installed lithium-ion battery(ies) comply with the applicable test requirements[5]. A disadvantage of this requirement is that it may be a challenge for the passengers with reduced mobility to obtain the battery test summary from the manufacturer in case this is not part of the manufacturer's instruction manual.

4. PROPOSAL 3: LIMITATIONS TO MOBILITY AIDS

4.1 The third proposal is to introduce a condition under which a mobility aid may be offered for transport by disabled passengers as checked baggage and to highlight that the passenger provisions in the Technical Instructions do not provide any restrictions on the purposes for which the mobility aids can be used.

4.2 Currently, mobility aids for daily use as well as for sporting or other purposes can be offered for transport by disabled passengers as checked baggage. United States regulations specify that that a disabled passenger can only offer mobility aids for transport if they are required for daily use.

4.3 The introduction of a similar condition in the provisions for passenger and crew would have the advantage of excluding a large number of mobility aids equipped with high performance and large capacity batteries such as those for sporting or other purposes. However, these could still be offered for transport as cargo.

5. PROPOSAL 4: MAINTAIN THE CURRENT SITUATION

5.1 The fourth proposal is to maintain the current regulatory framework and leave Part 7;2.13.3.2 b) 2) and c) and Table 8-1 (Provisions for dangerous goods carried by passengers and crew) of the Technical Instructions unchanged. This approach would prevent the introduction of additional complexities and operational burdens for both operators and passengers with reduced mobility.

[5] Report of the twenty-ninth meeting of the Dangerous Goods Panel (DGP/29-WP/42), Appendix A to the Report on Agenda Item 4 (Bow tie diagrams) and Appendix B to the Report on Agenda item 4 (STPA Report).

5.2 The existing regulatory framework provides flexibility for operators to assess the risks of lithium-ion battery powered mobility aids on a case-by-case basis through the conducted safety risk assessment. However, maintaining the current situation also provides challenges. The absence of specific restrictions or guidelines on the Watt-hour capacity of installed batteries places a burden on operators to make safety decisions without clearly defined regulatory criteria.

5.3 As battery technology advances and Watt-hour ratings increase, the risks associated with higher-capacity batteries seem likely to grow. While maintaining the current regulatory framework ensures continuity, it may not sufficiently prepare the aviation industry and passengers with reduced mobility for future developments in lithium-ion battery technology and leaves the growing safety concerns unresolved.

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