国 际 民 用 航 空 组 织

DGP/24-WP/41
30/8/13

工 作 文 件

危险品专家组（DGP）

第二十四次会议

2013 年 10 月 28 至 11 月 8 日，蒙特利尔

议程项目5： 在可能的范围内，解决空中航行委员会或专家组查明的非经常性的工作项目：

5.1： 审查关于运输锂电池的规定

第 9 类 — 危险性通知

（由秘书处提交）

摘要

危险品专家组的行动：请专家组成员审议第9类物质和物品的危险性通知问题，并考虑及以下方面：

— 将某些物品划归为第9类是否适当？

— 如果第9类不是最适当的类别，是应该考虑在该类别下新设项别还是新设一个类别？

— 鉴于没有适当的类别/项别来反映实质上的危险特性，例如潜在的热逃逸、短路、充电状态、电的特性、电的和化学的双重特性等，更好的危险性通知是不是一个问题？

— 是否需要改进目前的标签/标记要求，以便确保向应急响应人员和从事危险品运输/操作的人员/组织做出有效和适当的危险性通知？

— 风险是否应该虑及移送运输的具体物品的尺寸、数量和能量密度（如适当）？

1. INTRODUCTION

1.1 At the last UN SCETDG meeting (24 to 28 June 2013), ICAO presented a paper on the need for appropriate hazard communication for electric storage systems (see Appendix A). Although the original intent was to focus on lithium batteries only, it became evident a wider discussion on Class 9 substances and articles was desirable.

1.2 It was noted that within the UN Model Regulations, 59 substances and articles of Class 9 are subdivided into 10 groupings as follows:

a) Substances which, on inhalation as fine dust, may endanger health (2 entries);

b) Substances evolving flammable vapour (2 entries);

c) Lithium batteries (6 entries);

d) Capacitors (2 entries);

e) Live-saving appliances (3 entries);

f) Substances and articles which, in the event of fire, may form dioxins (6 entries);

g) Substances transported or offered for transport at elevated temperatures (2 entries);

h) Environmentally hazardous substances (2 entries);

i) Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs) (2 entries); and

j) Other substances or articles presenting a danger during transport, but not meeting the definitions of another class (32 entries).

1.3 It was suggested some consideration could be given to gathering together some of these groupings to form divisions of class 9 e.g. groupings 1, 6, 8 and 9 (plus some entries from 10 e.g. Dry ice, Benzaldehyde) might represent those harmful to health or the environment. Such groupings could then be used for the creation of divisions within class 9. Alternatively, consideration could be given to the allocation of energy storage devices only to a new class 10. Such energy storage devices could include vehicles and dangerous goods in machinery in addition to lithium batteries and capacitors i.e. the storage of energy, regardless of the form, is the potential hazard in transport.

1.4 An extract from the report of the meeting is presented below.

E. Miscellaneous

4. Appropriate hazard communication for Class 9

Document: ST/SG/AC.10/C.3/2013/26 (ICAO)

Informal document: INF.55 (ICAO)

53. Most delegations recognized that the Class 9 label alone did not make it possible to adequately communicate the hazard or hazards posed by the many different groupings of substances and articles of Class 9, in particular when such articles contained dangerous goods of other classes or posed specific hazards such as electrical shocks or short circuits, as was the case for electric storage systems. However, there was no consensus, and no final conclusion could be drawn on how to improve the hazard communication for Class 9.

54. The communication of hazards was of interest not only to transport

workers who handled the packages, but also to emergency responders. It would thus be advisable to determine for each mode of transport which additional hazard communication elements would genuinely be required, bearing in mind the basic principles set out in paragraphs 12, 13 and 15 of the Recommendations.

55. Because of the variety of the hazards posed by the various electric storage systems, it had so far been impossible to foresee uniform treatment of all such systems.

56. All the experts and organizations concerned were asked to give consideration to the issues raised by ICAO so as to find a solution that would avoid having separate approaches for each mode of transport.

Secretariat note – The basic principles of the Recommendations referred to in paragraph 54 are reproduced in Appendix B to this working paper.

2. Panel members are invited to consider the issues raised in Appendix A to this working paper and to note the request by the Sub-Committee to give consideration to hazard communication elements which would genuinely be required, especially by emergency responders.

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APPENDIX A

PAPER PRESENTED BY ICAO AT THE UN SCETDG MEETING (24 to 28 June 2013)

United Nations ST/SG/AC.10/C.3/2013/26

Secretariat

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Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

Forty-third session
Geneva, 24–28 June 2013
Item 4 (e) of the provisional agenda
Electric storage systems: miscellaneous

Electric storage systems – appropriate hazard communication

Transmitted by the International Civil Aviation Organization (ICAO)[1]

Introduction

1. At its forty-first session, the Sub-Committee noted the proposal by ICAO (informal document INF.50) that energy storage devices should constitute a specific group of dangerous goods with specific provisions and agreed that this issue should be considered in the next biennium (ST/SG/AC.10/C.3/82, paragraph 107 refers). It had been noted by ICAO that whilst class 9 includes miscellaneous dangerous substances and articles, only one danger label is assigned to this class and had queried whether this was sufficient to communicate correctly the potential risks posed by these articles e.g. lithium batteries present both electrical and chemical (flammable electrolyte) hazards which are rather different to those posed by substances as diverse as dry ice or environmentally hazardous substances. In addition, it was suggested that, with constantly developing new technology, new articles will be brought to the Sub-Committee, some of which may well be classified as class 9.

2. With regard specifically to lithium batteries in air transport, this has been the subject of extensive discussion by the ICAO Dangerous Goods Panel (DGP).

[1] In accordance with the programme of work of the Sub-Committee for 2013-2014 approved by the Committee at its sixth session (refer to ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

- Informal document INF.51 at the 41st session contained the report of a special meeting devoted to this subject, in particular for those batteries excepted under special provision 188. Resulting amendments to the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* included requirements for training, documentation, operator acceptance checks and provision of information to the pilot-in-command.

- It is obvious that fire on board an aircraft poses one of the most significant threats to safety during flight. Although lithium batteries are allowed as cargo on both passenger and cargo aircraft, it must be noted that aircraft fire suppression systems (Halon 1301) are unable to extinguish lithium metal battery fires. For lithium ion batteries, although Halon 1301 is effective in controlling an open flame and the spread of the fire to adjacent materials, it is not effective in stopping the propagation of thermal runaway within the shipment. Previous decisions by the DGP resulted in the development of a handling label for these excepted batteries in order to convey information to personnel handling them of the risk of fire and that care must be taken to prevent damage to them.

3. In previous biennia, the issue of energy storage systems has been raised (ST/SG/AC.10/C.3/2009/26, informal documents INF.37 and INF.62 at the 35th session) in which discussions focused on the risks posed in transport and how the regulatory requirements addressed the risks. Three categories of hazard posed by electric storage devices were identified:

(a) Chemical hazard based on the electrolyte or material contained within the article

(b) Electrical hazard based on electric storage – dependent on the state of charge and

(c) Both chemical and electrical hazards.

4. Further discussion of the dual chemical and electrical properties of different articles (informal document INF.37, 35th session) led to the Sub-Committee noting "the opinion according to which it was not necessary to deal with electricity storage systems in a special section of the Model Regulations, and also the recommendation that the regulatory scheme currently applicable to them should not be modified." (ST/SG/AC.10/C.3/72, paragraph 52). However, this did not take into account the conclusion contained in the analysis in which it was stated "Batteries transported in a charge state may present such dual properties when they are subject to short-circuit during transportation." Nor did it include any discussion on the possibility of defining an order of precedence i.e. the cases in which the electrical hazard take precedence over the chemical hazard, as suggested in informal document INF.62 (35th session), and the possible need for communication of the electrical hazard.

5. The Sub-Committee is reminded that Part 2 of the Guiding Principles for the Development of the United Nations Model Regulations contains explanatory material outlining the rationale behind the development of the nine classes of dangerous goods:

> To accommodate the large number of dangerous goods and the consistent, rapid development of new substances, the unusual chemical names used to describe them and the different emergency response for them, the Sub-Committee devised tests and criteria to be used to determine which substances could be identified as dangerous goods in transport. The Sub-Committee then devised a system of nine classes for substances with the objective of dividing all current and future dangerous goods into these classes. The system of classes was established keeping in mind the type of containment to be used, the chemical and physical characteristics of the substances

and response procedures that would be most appropriate in the event of an accidental release.

Prior to 1989, classification of lithium batteries would have been based on the chemical lithium, resulting in assignment to Division 4.3 "Substances which, in contact with water, emit flammable gases", packing group I. They were classified as *articles* in Class 9 in the sixth edition of the United Nations Recommendations on the Transport of Dangerous Goods (1989).

6. Based on the foregoing, it is suggested that the following should be considered:

- Is classification of *some* articles to Class 9 appropriate? If yes, what is the rationale behind this assignment, keeping in mind the explanatory material in the Guiding Principles given above?

- If Class 9 is not the most appropriate classification, should consideration be given to new divisions in that class or a new class?

- Is better hazard communication an issue, given that there is no appropriate class/division available to reflect the intrinsically hazardous properties e.g. potential thermal runaway, short circuit, state of charge, electrical properties, dual electrical and chemical properties? If yes, what pictograms/colours would be appropriate to communicate the "different" hazard – the standard "electric shock risk" symbol? Could the "electric shock risk" symbol be incorporated into a new hazard label for those articles identified as possessing the hazard? (either for a new class or division or for those entries identified by UN number)

- Do the current labelling/marking requirements need improvement in order to ensure effective and appropriate hazard communication is given to emergency responders and personnel/organizations involved in the transport/handling of dangerous goods?

- Should the risks take into account the size, quantities and, where appropriate, the energy densities of the particular articles being moved in transport?

Proposal

7. The Sub-Committee is invited to consider whether assignment to class 9 with the consequential danger label (No. 9) is sufficient to convey the specific dangers posed by electric storage devices such as lithium batteries. Depending upon the outcome of the discussion, a paper will be submitted to the Sub-Committee of Experts on the Transport of Dangerous Goods or the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, if appropriate.

APPENDIX B

RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS MODEL REGULATIONS VOLUME I

RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

NATURE, PURPOSE AND SIGNIFICANCE OF THE RECOMMENDATIONS

1. These Recommendations have been developed by the United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods[1] in the light of technical progress, the advent of new substances and materials, the exigencies of modern transport systems and, above all, the requirement to ensure the safety of people, property and the environment. They are addressed to governments and international organizations concerned with the regulation of the transport of dangerous goods. They do not apply to the bulk transport of dangerous goods in sea-going or inland navigation bulk carriers or tank-vessels, which is subject to special international or national regulations.

2. The recommendations concerning the transport of dangerous goods are presented in the form of "Model Regulations on the Transport of Dangerous Goods", which are presented as an annex to this document. The Model Regulations aim at presenting a basic scheme of provisions that will allow uniform development of national and international regulations governing the various modes of transport; yet they remain flexible enough to accommodate any special requirements that might have to be met. It is expected that governments, intergovernmental organizations and other international organizations, when revising or developing regulations for which they are responsible, will conform to the principles laid down in these Model Regulations, thus contributing to worldwide harmonization in this field. Furthermore, the new structure, format and content should be followed to the greatest extent possible in order to create a more user-friendly approach, to facilitate the work of enforcement bodies and to reduce the administrative burden. Although only a recommendation, the Model Regulations have been drafted in the mandatory sense (i.e., the word "shall" is employed throughout the text rather than "should") in order to facilitate direct use of the Model Regulations as a basis for national and international transport regulations.

3. The scope of the Model Regulations should ensure their value for all who are directly or indirectly concerned with the transport of dangerous goods. Amongst other aspects, the Model Regulations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and transport documents. There are, in addition, special requirements related to particular classes of goods. With this system of classification, listing, packing, marking, labelling, placarding and documentation in general use, carriers, consignors and inspecting authorities will benefit from simplified transport, handling and control and from a reduction in time-consuming formalities. In general, their task will be facilitated and obstacles to the international transport of such goods reduced accordingly. At the same time, the advantages will become increasingly evident as trade in goods categorized as "dangerous" steadily grows.

PRINCIPLES UNDERLYING THE REGULATION OF THE TRANSPORT OF DANGEROUS GOODS

4. Transport of dangerous goods is regulated in order to prevent, as far as possible, accidents to persons or property and damage to the environment, the means of transport employed or to other goods. At the same time, regulations should be framed so as not to impede the movement of such goods, other than those too dangerous to be accepted for transport. With this exception, the aim of regulations is to make transport feasible by eliminating risks or reducing them to a minimum. It is a matter therefore of safety no less than one of facilitating transport.

5. The Model Regulations annexed to this document are addressed to all modes of transport. Modal transport regulations may occasionally apply other requirements for operational reasons.

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[1] *In 2001, the Committee was reconfigured and renamed "Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals" (see resolution 1999/65 of 26 October 1999 of the Economic and Social Council).*

CLASSIFICATION AND DEFINITIONS OF CLASSES OF DANGEROUS GOODS

6. The classification of goods by type of risk involved has been drawn up to meet technical conditions while at the same time minimizing interference with existing regulations. It should be noted that the numerical order of the classes is not that of the degree of danger.

7. The objective of the recommended definitions is to indicate which goods are dangerous and in which class, according to their specific characteristics, they should be included. These definitions have been devised so as to provide a common pattern which it should prove possible to follow in the various national and international regulations. Used with the list of dangerous goods, the definitions should provide guidance to those who have to use such regulations; and they present a notable degree of standardization while retaining a flexibility that allows diverse situations to be taken into account. Classifications for substances in the Model Regulations are made on the basis of consideration of data submitted to the Committee by governments, intergovernmental organizations and other international organizations in the form recommended in Figure 1. However the actual data submitted are not formally endorsed by the Committee.

8. The Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.5, Amend.1 and Amend.2) present the United Nations schemes for the classification of certain types of dangerous goods and gives descriptions of the test methods and procedures, considered to be the most useful, for providing competent authorities with the necessary information to arrive at a proper classification of substances and articles for transport. It should be noted that the Manual is not a concise formulation of testing procedures that will unerringly lead to a proper classification of products and it assumes, therefore, competence on the part of the testing authority and leaves responsibility for classification with them. The competent authority has discretion to dispense with certain tests, to vary the details of tests and to require additional tests, when this is justified, to obtain a reliable and realistic assessment of the hazard of a product.

9. Wastes should be transported under the requirements of the appropriate class considering their hazards and the criteria presented in the Model Regulations. Wastes not otherwise subject to these Regulations but covered under the Basel Convention[2] may be transported under Class 9.

10. Many of the substances listed in Classes 1 to 9 are deemed as being dangerous to the environment. Additional labelling is not always specified except for transport by sea. Criteria for substances and mixtures dangerous to the aquatic environment are given in Chapter 2.9 of the Model Regulations.

11. Many consignments of goods are treated with fumigants that pose a risk during transport, in particular to workers who may be exposed unknowingly when they open cargo transport units. The Model Regulations address fumigated cargo transport units as consignments that are subject to special documentation and warning sign requirements in the consignment procedures of Part 5.

CONSIGNMENT PROCEDURES

12. Whenever dangerous goods are offered for transport certain measures should be taken to ensure that the potential risks of the dangerous goods offered are adequately communicated to all who may come in contact with the goods in the course of transport. This has traditionally been accomplished through special marking and labelling of packages to indicate the hazards of a consignment and through the inclusion of relevant information in the transport documents and by placarding of cargo transport units. Requirements in this regard are provided in the Model Regulations annexed to this document.

13. The labels recommended in 5.2.2.2 of the Model Regulations should be affixed on goods or packages. The labelling system is based on the classification of dangerous goods and was established with the following aims in mind:

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[2] *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989).*

(a) To make dangerous goods easily recognizable from a distance by the general appearance (symbol, colour and shape) of the labels they bear;

(b) To provide, by means of colours on the labels, a useful first guide for handling, stowage and segregation.

14. In certain cases, where the danger of an item of dangerous goods is considered low, or the goods are packed in a limited quantity, exemptions from labelling may be provided. In such cases, marking of packages with the class or division and the packing group number may be required.

15. One of the primary requirements of the transport document for dangerous goods is to convey the fundamental information relative to the hazard of the goods being offered for transport. To achieve this end, it is considered necessary to include certain basic information in the transport document for the dangerous goods consignment unless otherwise exempted in the Model Regulations. It is recognized that individual national authorities or international organizations may consider it necessary to require additional information. However, the basic items of information considered necessary for each dangerous substance, material or article offered for transport by any mode are identified in the Model Regulations.

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