

**Maria Nicopulos**

Doradca ds. bezpieczeństwa w przewozie towarów niebezpiecznych,  
Doradca w transporcie lotniczym IATA DGR kat. 6, Starszy Inspektor BHP  
maria.nicopulos@ekoskolar.com.pl

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**Air transport of dangerous goods**

**Abstract:** The article describes the system of creating legal regulations concerning the rules and conditions relating to the carriage of dangerous goods in various fields of transport: by air, sea, land (road, rail, inland waterways). The first and the second parts show the development system of the regulations. The third part is dedicated to the general principles of air transport of hazardous materials in accordance with the IATA DGR e.g.: classification, training, packaging, labeling, documentation and other duties of the participants. The fourth part describes the differences in the requirements in the field of multimodal transport of dangerous goods.

**Keywords:** Air transport; Transport of dangerous goods

**Introduction**

Dangerous goods around the world are regularly transported by air. To ensure safety and reduce the risk during carriage of every country in accordance with the provisions of the Chicago Convention [2] should introduce international safety standards into national legislation. Conditions for the transport of hazardous materials developed ICAO (The International Civil Aviation Organization, based in Montreal, is a specialized agency of the United Nations. It was established in 1994 under the Convention on International Civil Aviation) and IATA (International Air Transport Association) is the global trade organization based in Montreal and Geneva bringing together approximately 230 airlines). These conditions are contained in the ICAO Technical Instructions and IATA DGR regulations [1] (regulations concerning the transport of dangerous goods). Through the development of ICAO understands the technical instructions for the safe transport of dangerous goods by air, referred to in Section R of Annex III to Council Regulation (EEC) No 3922/91 of 16 December 1991 on the harmonization of technical requirements and administrative procedures in the field of civil aviation (Acts. office. L 373, 31.12.1991, p. 4, as amended. d. ; Acts. office. Polish special edition, ch. 7, vol. 1, p. 348), promulgated Decree No. 9 of the President Civil Aviation Authority of 10 May 2012 on the technical instructions for the safe transport of dangerous goods by air (Acts. Office. ULC pos. 36). IATA DGR regulations for the carriage of dangerous goods which are the textbook interpretation of the legal and practical knowledge in the field of air transport of dangerous goods developed on the basis of the ICAO Technical Instructions. It is published by the International Air Transport Association.

In Poland there is also an Act on aviation law of 3 July 2002 [7] and Regulation of the Minister of Transport, Construction and Maritime Economy of 13 July 2012 on the detailed conditions of implementation of international flights to hazardous materials [4].

Due to the system of creating legal regulations there is no complete harmonization in the regulations and conditions for all modes of transport of dangerous goods i.e.: the air, sea, land (road, rail, inland waterways). The following considerations are intended to draw attention to the differences in the terms and conditions of multimodal transport of dangerous goods.

### The legal regulations

Committee of Experts UN Committee for Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals Materials is a team of experts submitted by the competent authority of the representative of the UN member states. It is headed by Economic and Social Council of the United Nations (UN ECOSOC). Committee deals with security and unification of the rules on classification, labelling and transport of dangerous goods on a global scale. This is due to the necessity of developing recommendations for all types of transport: air, sea and land (road, rail, inland waterways). Every two years, the United Nations Economic Commission for Europe (UNECE) issues - prepared by the Committee of Experts - documents: *Model Regulations for all means of transport, Manual of Tests and Criteria, rules GHS* (Scheme 1). GHS (Global Harmonised System) this is the Globally Harmonized System of Classification and Labelling of Chemicals. System of classification and labelling substances and mixtures developed by the UN in order to harmonize the existing standards used in different countries by adjusting the criteria for classification and labelling and communication about the risks. On this basis, is amended annually ICAO Technical Instructions and IATA DGR (chart 2), while the rules for the inland transport of dangerous goods: The ADR [5] The RID Regulations [3], ADN Agreement [6] are amended every two years by the authorities of the European Union.



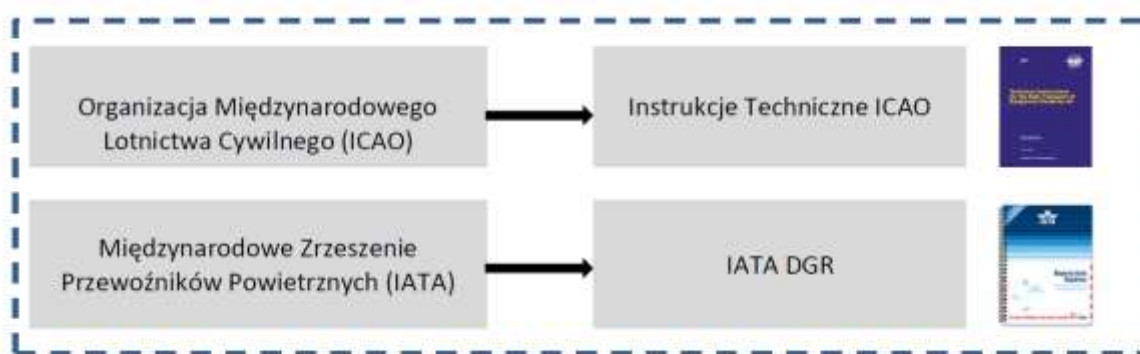
1. The system of regulations transport of dangerous goods

Source: dr inż. Krzysztof Grzegorzczak, Prace zespołów eksperckich ONZ jako cenne źródło informacji dla DGSA, Materiały konferencyjne: XIV Seminarium ADR poświęcone wymianie doświadczeń związanych z transportem towarów niebezpiecznych, 7 - 8 kwietnia 2014 r., Gdańsk, Organizator: Stowarzyszenie Doradców ds. Transportu Towarów Niebezpiecznych – DGSA

### Legal regulations in the field of air transport

International Civil Aviation Organization is responsible for the development and implementation of international regulations governing the safety of air traffic. Members of the ICAO are 191 countries. Poland was one of the countries that signed on December 7, 1944 Chicago Convention. The instruments of ratification Polish party applied on April 4, 1947 but due to the political situation until 1957 could not participate in the work of ICAO. Poland became a member of ICAO finally upon ratification of the Convention, i.e. November 20, 1958. The aim of ICAO specified in Article. 44 of the Chicago Convention is "developing the principles and techniques of international air navigation and fostering the planning and development of international air transport" [2].

In the field of air transport of dangerous goods by the most important elements of activity ICAO is setting international standards and recommendations, as well as methods in terms of civil aviation safety, to establish procedures for air navigation services as well as other documents classified as manuals, guidelines and best practice documents. Developed by the ICAO Technical Instructions contain a comprehensive set of requirements for the safe transport of dangerous goods by air. The International Air Transport Association IATA cooperate with the International Civil Aviation Organisation (ICAO), which made it a global regulator and it appears on the basis of the ICAO Technical Instructions so called. IATA DGR - a set of regulations for air transport of dangerous goods.



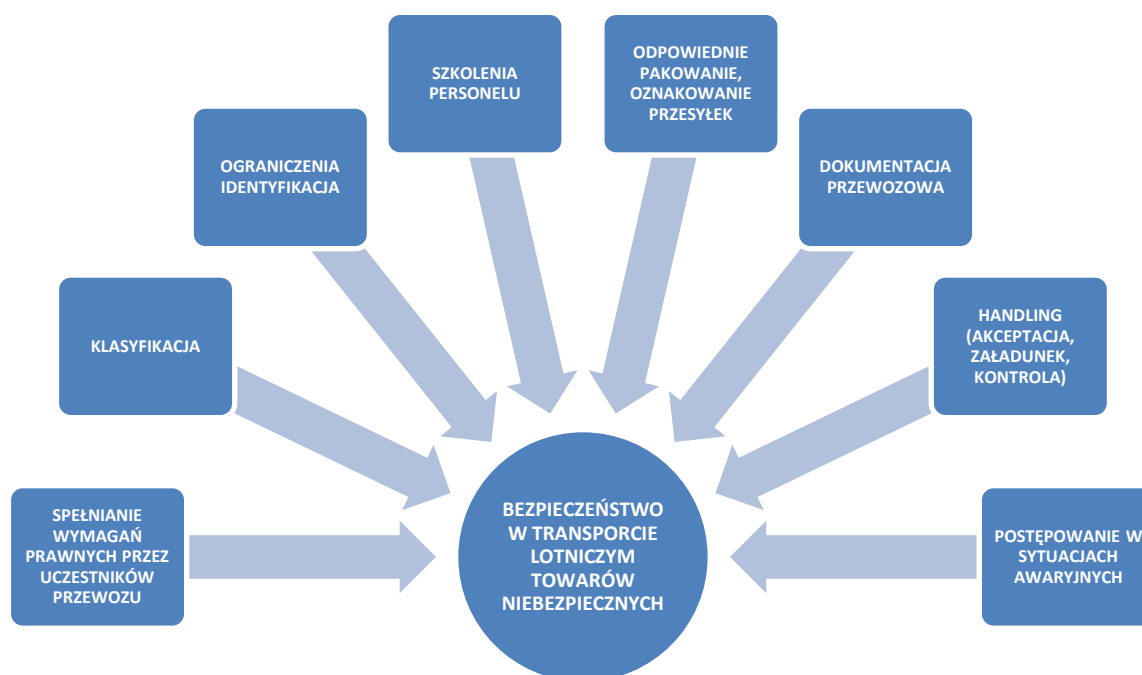
## 2. Organizations issuing regulations relating to air transport of dangerous goods

Source: Own work

### General rules for the air transport of hazardous materials in accordance with the IATA DGR

Dangerous goods as defined by IATA DGR are articles or substances that may pose a risk to health, safety, property or the environment and which are indicated in the list of dangerous goods and are classified in accordance with these Regulations.

The most important elements of the system affecting the security of air transport of dangerous goods are described in the individual sections of IATA and presented in the diagram below.



### 3. Factors affecting the safety of air transport of dangerous goods

Source: Own work

**The fulfillment of legal requirements for participants** is one of the most important elements of the security system. The sender and the carrier (operator, user airlines) should, in any case, comply with the relevant legal requirements.

The sender must comply with the Regulations IATA DGR and the relevant provisions laid down for the country of origin, transit or destination. Before sending to consignment or packaging must ensure that the:

- dangerous goods are not prohibited for the air transport;
- dangerous goods are properly classified, packaged, marked, labelled and accompanied by the relevant documents,
- people involved in any way in the operations related to transport shipments are trained in the requirements associated with the transport, according to their responsibilities and duties of.

The carrier is obliged to act in accordance with the Regulation IATA DGR. Its responsibilities are described in detail in Chapter 9 Handling and concern, among others, acceptance of shipments, their storage, loading, inspection, security, information, behaviour in emergency situations, staff training.

**Classification.** Basically, the dangerous goods are divided into 9 classes according to the threat that pose. Assignment of dangerous substance or article to one or more additional risk is made on the basis of the criteria of the class or classes corresponding to those risks, referred to in the provisions of the IATA DGR. Class 1 Explosives Class 2 Gases Class 3 Flammable liquids Class 4.1 Solid combustible, Class 4.2 solid prone to inflammation, Class 4.3 solid hazardous in contact with water Class 5.1 Oxidising substances Class 5.2 Organic peroxides Class 6.1 Poisonous substances Class 6.2 Infectious substances Class 7 Radioactive material Class 8 Corrosive, Class 9 hazardous materials different.

On this basis, we have developed a detailed list of about 3,000 specified by the United Nations hazardous materials with their characteristics and the conditions under which they should be accepted for air transport. The list includes items which do not occur in land transport (ID8000). Some goods not liable under requirements of RID / ADR / ADR must comply with the specific requirements of aviation regulations (UN 1845 dry ice, UN2807 magnetized material).

**Restrictions, Identification.** Some materials have been identified as too dangerous for transport, others may be allowed only on condition permits countries involved in the carriage; Some materials can be transported by cargo aircraft, but most can be safely transported on passenger aircraft provided that the requirements which are determined by DGR. Passengers and shippers of freight must be given the necessary information that will allow them to distinguish between materials permitted to carry with them (in pockets of worn clothes) in hand luggage or as cargo, and to draw attention to the danger of hidden threats transported materials. In terms of total or partial exemption can be distinguished several groups of goods: (1) Dangerous goods prohibited for transport unconditionally, (2) Hidden dangerous goods (3) Dangerous Goods in passengers' baggage or crew, (4) Dangerous goods in postal packages, (5) dangerous goods owned by airline, (6) dangerous goods in small packs (Limited quantities) (7) dangerous goods packed in excepted quantities.

**Staff training** is an essential element to ensure the maintenance of safety requirements. All employees involved in the carriage of dangerous goods must receive appropriate training in accordance with the scope of their duties. Minimum training requirements relating to the carriage of hazardous materials for specific groups of employees are described in Table 1.5. IATA DGR. Training requirements in Table 1.5. IATA DGR.

**Appropriate packaging and labelling of shipments.** Packages are an extremely important element of safe air transport of hazardous materials. IATA DGR Packing Instructions include all hazardous materials, including the specification of possible use of packaging and the detailed rules for the carriage of hazardous materials in so called limited quantities. All goods must be packed in packaging certified by the UN (certificate of packaging), and marked with a label containing the full address of the sender and the recipient, UN number, proper shipping name and quantity of the goods. It is necessary to put on the packaging label / s of hazards and ground handling.



4. Example of handling labels used only in air transport

**Transportation documentation.** It is necessary to prepare and sign the sender declaration Shipper's Declaration for Dangerous Goods, which has to find the route of the goods, the sender and recipient ports of departure and arrival, type of aircraft (passenger, cargo), the correct record of dangerous goods specifying the applicable packing instruction and information about the number of shipments.

In addition to the captain of the aircraft should get a written document NOTOC about how the goods are on board machine, in which the container was placed in which compartments and which route it is transported. NOTOC (Notification to Captain document) is designed for the aircraft with a cumulative summary of shipments of hazardous and their distribution on board code threats ERG and other information

**Handling.** The liability of airlines (Carrier) refers to the acceptance of shipments, their storage, loading, control, information security, reporting events from hazardous materials, training of personnel, document storage.

**Emergency handling.** In the event of an accident in the course of the flight crew shall follow the textbook Emergency Response Guidance based on the code threats ERG on a document NOTOC. Emergency Response Guidance (Red Book) is a procedural guide for emergency response in emergency situations involving dangerous goods

### **Multimodal transport.**

Conditions of carriage in a transport chain including carriage by land RID / ADR / ADN and air in accordance with the transport regulations - one way. Regulations concerning the mutual acceptance are respectively in the RID / ADR / ADN and authorize release for carriage in a transport chain of packages that do not meet the requirements of RID / ADR / ADN, but are consistent with the requirements of the ICAO Technical Instructions for packaging, packing together, labelling, the use of warning labels. Similar regulations are not in the ICAO Technical Instructions, which means always necessary to use all requirements of regulations the IATA DGR.

### **Summary**

The requirements of air transport are the most restrictive in relation to the carriage of dangerous goods. On board the aircraft goods, which do not consider to be dangerous in land transport, pose a real risk to passengers and crew. When preparing the shipment must meet all the requirements of the IATA DGR keeping in mind the significant differences occurring in the application of exemptions, packaging, labelling, documentation, training.

### **Source materials**

- [1] IATA Dangerous Goods Regulations. Regulacje dotyczące przewozu towarów niebezpiecznych – podręcznik będący wykładnią prawną i praktyczną w zakresie przewozu lotniczego towarów niebezpiecznych opracowane na podstawie instrukcji technicznych ICAO i wydawany przez Międzynarodowe Zrzeszenie Przewoźników Powietrznych
- [2] Konwencja o międzynarodowym lotnictwie cywilnym, podpisana w Chicago dnia 7 grudnia 1944 r. (Dz. U. z 1959 r. Nr 35, poz. 212 i 214, z późn. zm.)
- [3] Regulamin dla międzynarodowego przewozu kolejami towarów niebezpiecznych (RID), stanowiący załącznik C do Konwencji o międzynarodowym przewozie kolejami (COTIF), sporządzonej w Bernie dnia 9 maja 1980 r. (Dz.U. z 2013 r. poz. 840) wraz ze zmianami
- [4] Rozporządzenie Ministra Transportu, Budownictwa i Gospodarki Morskiej z dnia 13 lipca 2012 r. w sprawie szczegółowych warunków wykonywania lotów międzynarodowych z materiałami niebezpiecznymi (Dz.U. z 2012 r. Nr 0, poz. 898)
- [5] Umowa europejska dotycząca międzynarodowego przewozu drogowego towarów niebezpiecznych (ADR), sporządzoną w Genewie dnia 30 września 1957 r. (Dz.U. z 2015 r., poz. 882), wraz ze zmianami
- [6] Umowa europejska dotycząca międzynarodowego przewozu śródlądowymi drogami wodnymi towarów niebezpiecznych (ADN), zawartą w Genewie w dniu 26 maja 2000 r. (Dz.U. z 2010 r., poz. 1537), wraz ze zmianami
- [7] Ustawa z dnia 3 lipca 2002 r. Prawo lotnicze (Dz.U. z 2002 r. Nr 130, poz. 1112)