

How to transport batteries and other dangerous goods

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Transportation of dangerous goods by air is not like a new business, but yet to be mastered by all, who have a need for such transportation. Dmitry Kurdchenko, the Director General of InterCargo Expertise knows all the angles on dangerous goods transport. Kurdchenko told about the nuances of air transportation of hazardous goods at the Space Logistics/SPACELOG-2016 conference so that the exporters did not commit serious or even irrecoverable mistakes, and they better understood what they would have to encounter and what to be responsible for.

Soviet was good!

At some time, Soviet Union had independently developed the dangerous goods regulations. This process ended in 1975, and until today, those old rules are the most elaborate document available in the world. However, it is not being used, as precisely in the 70ies our country acceded to the Convention on International Civil Aviation and changed over to other conditions of operation with dangerous goods. The specifics of the regulations, developed in the USSR consist in that it was never necessary for the exporter from the Soviet Union to spend either money or time on classification of the product. It was sufficient for him to approach the Ministry of Chemical Industry, and the government rendered full service to him viz. explained how to transport and what was required to be done so that it was safe.

Another salient feature of the Soviet regulations was the total prohibition on transportation of dangerous goods with passengers. The Soviet planes were designed with consideration of this requirement, and sequence of activities in emergency existed for each individual type of aircraft.

Having signed the Convention and acquiring specific obligations towards the UN and IAEA, Soviet Union, and later Russia were caught in the requirement to implement the regulatory documents, developed for the entire globe by the UN Transport Committee, in the national legislation. The Committee works as follows: first, it forms the requirements themselves, and then they begin to be adapted to the land and sea transport and aircrafts. Modal organizations are formed, one of them being ICAO. They develop the specific rules, applicable for the transport by each mode of transport. Correspondingly, these rules are included in the national laws and become mandatory for the transport operators and industry.

What does the UN transport committee do? Essentially the same that the USSR Ministry of Chemical Industry did at one time viz. it selects the unified codes for all the states so that people in any country understood that for example, the given cargo is nothing other than sulfuric acid, and easily distinguished from say for example, hydrochloric acid. A specific expertise of the applications is made and a UN code is assigned to each hazardous cargo item.

Then information is brought to the notice of ICAO, which decides on the possibility of transportation and establishes the rules of packaging, marking and specific restrictions for the quantity of transported substances.

The convention on international civil aviation was adopted in 1944, and entered into force three years later. Currently more than 190 states participate in it. The power of the Convention consists in that if any state ceases to fulfil its requirements, the remaining member countries of the Convention simply close their air space for it. Similar sanctions can be applicable not only on the states, but also on specific operators, i.e. airlines.

The international practice regulation in emergencies allows transport dangerous goods on passenger planes or regular cargo flights. ICAO has divided cargo into four basic groups:

1. Non-dangerous goods
2. Dangerous goods that can be transported with the passengers
3. Dangerous goods that can be transported on regular cargo flights.
4. Dangerous goods that can be transported under special exemptions.

The decision on allowing the dangerous goods for one or other transportation is taken by the shipper enterprise taking account of the UN and ICAO classification. The personnel, who had undergone special training, are permitted to take such decision and prepare the cargo for transportation. It is one of the mandatory conditions, written in the Convention. The responsibility of the carrier as such is only 30 percent of that responsibility which the shipper bears if the dangerous goods shall go out of control.

Thimbleful carriage

Naturally, the most rigid requirements to the transportation of dangerous goods are presented for passenger flights, since the dangerous goods are transported on the lower deck below the passengers. At present, due to the sanctions the requirement for such transportation has increased. Earlier a sixty liter capacity kerosene drum, which was required to be urgently transported to Kourou Space Center, a Russian exporter could send by cargo flight with transshipment at any European capital. The cost of such transit carriage on regular cargo flights constituted two-three thousand dollars that was quite acceptable. However, now the customs of many states do not allow fast transshipment. The Customs simply do not allow Russian dangerous cargo, demand additional documentation, and all these take time, and urgency is compromised. This conditional drum is to be divided into containers of five liters each, permitted for carriage on passenger planes so that the dangerous cargo can be sent by direct passenger flights without transshipment in other states.

Why batteries were prohibited

Until recently the opportunity to transport fully charged lithium-ion batteries on cargo planes existed based on 35 kg for one cargo piece, and on passenger planes based on 5 kg for one cargo piece. However, now transportation of such cargo on passenger planes is prohibited. The problem is that several large fire accidents took place on planes due to accumulator batteries. The reason being is the so-called thermal runaway of accumulator.

If we simply put a laptop for charging, and the system controlling it suddenly fails, the battery shall charge permanently and at some time it shall catch fire. Same effect will be if we place charged battery in fire. During explosion, one such laptop battery pack it releases up to 16 liters of hydrogen. If the accumulators are transported in tons, the regular firefighting system of the aircraft cannot handle the problem of such a scale. This was the reason for the ban of similar transportation on passenger planes.

These batteries have a specific feature: if short-circuit takes place in one of them following, for example, impact then the heat that it releases allows the neighboring battery's response. A chain reaction (propagation) takes place and nothing can be done with this. The experts have concluded that if the accumulator charge level can be reduced then during its potential explosion the neighboring batteries shall not react to this.

Controllers Americans

The American inspection is the leader of control over transportation of dangerous goods. The FAA center in Atlantic City operates to support control in this area. Everything that took place with dangerous goods is analyzed and simulated in this center. After this, a fine to the extent of up to half a million dollars is imposed on the shipper, whose cargo was the reason for the occurrence. Unfortunately, in Russia we do not have such a center.

Dangerous cargo is dangerous for all - not only for the plane's passengers, but also for those who are on the ground. In 1988, a cargo Boeing 747 crashed in the Netherlands. It happened that before the departure the cargo was not weighed, and the flight was permitted based only on the documents presented by the exporter. However, the exporter had cheated, declared too low a weight, as a result during takeoff the engines tore off from the plane, and whatever was in it fell not far from the Schiphol Airport. Among other things, 20 tons of dangerous cargo and four tons of non-hazardous military property were declared on board.

This could have passed for an ordinary catastrophe, but the rescuers who came to the incident site died. Moreover, more than 1000 people from the areas, adjoining the place of catastrophe were admitted to hospitals with poisoning. It was found that under non-dangerous military property toxic chemicals were transported, hence so many people suffered. Following this incident the information transfer regulation appeared viz. the ground shall mandatorily know what in particular has been loaded in the aircraft before its takeoff. This information shall be stored in a format, which all the other states through whose airspace the aircraft shall travel can comprehend.

Moreover, after the terrorist attacks of September 11 the list of cargo was made that come under the advance information sharing. Information about the cargo and its receivers shall be provided. This concept has been implemented in Russia in Decree 1070 and works outright in two systems of coordinates viz. European and American. According to the European rules, if import permits for high consequence dangerous goods are not provided the aircraft may not be unloaded, and the airline that imported this cargo shall return it to that country where it took it. The USA works under a different system viz. preliminary information sharing 4 hours in advance before arrival. The customs and emigration services of USA 4 hours in advance of the arrival of the liner shall get information about all cargos, which is on board to have the opportunity to take certain measures if necessary before the this aircraft approaches the American territory.

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