

SAFE AIR SHIPMENT OF DANGEROUS CARGO

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ABSTRACT

The paper focuses on the safety issues of air shipments of radioactive material (RM). The air routes are attractive, since they provide higher RM security, can pass by populated localities and nature reserves and be used for shipments from hard-to-reach locations, to keep tight schedules, to avoid transit countries, etc.

The paper analyzes safety of air shipments, provides statistics of air accidents including those during transportation of cargo by Volga-Dnepr Airlines. It demonstrates that the number of incidents and accidents in aviation has been steadily decreasing in recent years.

The paper also discusses current and prospective technical and organizational measures aimed at decreasing a probability of accidents and minimizing their consequences.

It summarizes experience in RRRFR shipments of irradiated and non-irradiated nuclear fuel by IL-76 and AN-124-100 aircrafts. Peculiarities of licensing, technical expertise and international support for air shipments are described. Examples of non-standard tasks for the RM shipments successfully performed by Volga-Dnepr Airlines due to its many-years' experience are provided.

INTRODUCTION

Volga-Dnepr Airlines founded in 1990.

JSC Volga-Dnepr Airlines registered in Ulyanovsk under number one thus becoming one of the first joint-stock companies in Russia and the first private cargo airline.

Today, Volga-Dnepr - Largest Russian freight airlines, leader in the heavy and outsize cargo transportation market.

Volga Dnepr Group enters TOP 15 world cargo airlines.

Unique fleet and of course, **unique An-124-100 aircraft** (biggest aircraft in the world for commercial use) makes Volga-Dnepr Airlines leader in the heavy and outsize cargo transportation market.

Own aircraft fleet:

- 10 – An-124-100 Ruslan (Volga-Dnepr Airlines)
- 5 – IL-76TD-90VD (Volga-Dnepr Airlines)
- 11 – B747F (AirBridgeCargo Airlines)
- 2 – B737 (Atran Airlines)
- 3 – An-12 (Atran Airlines)

Volga-Dnepr operates 10 AN-124-100, the world's largest fleet of such aircraft. Efficient combination of outstanding flight capabilities, size and volume of the cargo compartment and effective range of flight of AN-124-100 makes this Aircraft the undisputable leader of Outsize and Heavy Cargo Market.

IL-76TD Freighter is designed to carry all kinds of cargo including palletized shipments, non-standard and single-piece units weighing up to 50 tons. **Volga-Dnepr operates 5 new IL-76TD-90VDs**, the latter has no noise or operating restrictions and is capable to operate to any regions worldwide.

All-purpose **Boeing-747 freighter** is the flagship of AirBridgeCargo Airlines fleet. At the moment 11 aircraft of this type are in operation: 8 -400ERF and 3 new B-8F - the largest 747.

Volga-Dnepr Group structure.

There are two main services in Volga-Dnepr Group structure – Charter Services – Volga Dnepr Airlines (VDA) and Schedule Services – Air Bridge Cargo (ABC)

There are many supportive business such as: Insurance Company, International Studies Division, Engineering Logistic Center.

Historical Milestone.

1990 Volga-Dnepr Cargo Airlines were founded.

1991 First international commercial flight on An-124 RUSLAN Freighter. Volga-Dnepr and a UK HeavyLift Cargo Airlines company registered a Joint Venture HeavyLift- Volga-Dnepr (Stansted, UK)

2001 Joint Venture HeavyLift-VolgaDnepr terminated its existence and Volga-Dnepr undertook stand-alone global marketing and sales of An-124-100 cargo services. Sales - \$99,6 mln

2007 Sales achieved \$1 002 mln. The biggest contract in the history of Volga-Dnepr Group was signed – for construction of 5 Boeing 747 8F aircraft

2012 Volga-Dnepr has added a fifth new IL-76TD-90VD cargo aircraft to its fleet. ABC, part of Volga-Dnepr Group, has taken delivery of two new B-747-8 Freighters.

Since it's founding in 1990 Volga-Dnepr has supported peace keeping operations in Europe, Asia, Africa and Middle East. In addition to Governmental and humanitarian flights, Volga-Dnepr is very involved with commercial flights world-wide, supporting aerospace, aviation, oil and gas exploration, automotive and heavy equipment manufacturers.

Our representative commercial customer very well known, It's names:
Lockheed Martin, Boeing, BP, Shell, Halliburton, GE, NATO . . . Rosatom, Areva, Sosny, Tvel.

As the first Russian airline certified by U.S. Department of Defense (DoD) to operate the Antonov 124-100, Volga-Dnepr has been, and is, very involved in supporting America's Global War on Terror. To date, Volga-Dnepr has operated in excess of 13,000 missions in support of U.S. DoD operations transporting everything from Helicopters, Mark V-SEAL boats, Patriot Missile batteries, MRAP and MATV vehicles. In addition to the U.S. DoD, Volga-Dnepr also supports allied nations in their efforts to eliminate terrorism on a global scale.

Since its inception Volga-Dnepr has been also primarily involved in air transportation of dangerous goods, includes significant 17-year experience in air transportation of fissile nuclear materials of Class 7.

Unique Experience in the air transportation of nuclear materials.

From 1996 till 2013 Volga-Dnepr performed more than 473 flights to transport radioactive materials from/ to Russia.

1996 Volga-Dnepr were certificated by Russian Federal Service for Ecological, Technological and Atomic Surveillance of Russian Federation (Rostekhnadzor).

2006 Volga-Dnepr started preparing for RRRFR Program.

2009 First two An124 flights with SNF were operated - first experience in air transportation of RR SNF in type B(U) packages from Romania and Libya to Russia.

2011 Volga-Dnepr Airlines approved to handling cargo, including dangerous cargo, at Russian airports without the need to use external agencies.

2013 Volga-Dnepr has operated unique transportation of the spent nuclear fuel from Vietnam under RRRFR program - the first in the world use of the Type C TUK-145/C package, certified for transportation of spent nuclear fuel by air.

The question: "How to operate safe air shipment?" has highest priority for Volga-Dnepr Airlines.

From the beginning we had to mark out several main factors affecting safety of dangerous goods transportation, such as:

- Availability of necessary Licenses, Certificates and other Authorizations for air carriage of Dangerous Goods in accordance with the Law in effect.
- Own Aircraft Fleet certificated for Dangerous Goods transportations.
- Qualified and certified personnel.

Volga-Dnepr Airlines has the following certificates and licenses:

- Operator Certificate (OC) - the basic document issued by the aviation authorities of the state, by the registration place of the airline company. Operational specifications of the OC confirm the possibility of the airline company to perform domestic and international flights on cargo

- aircraft and to transport goods, including dangerous goods (all classes of dangerous goods, including fissile nuclear materials of Class 7);
- License of the Federal Service for Ecological, Technological and Nuclear Supervision for handling nuclear materials and radioactive substances during transportation. Sanitary-epidemiologic certificates are issued on all cargo aircraft of Volga-Dnepr that allows transportation of radioactive materials on any aircraft of the company;
 - Certificate of Compliance for aircraft maintenance;
 - Certificate of Compliance for organizational support of commercial air transport. It allows to the following:
 - (1) obtain permission from the aviation authorities of the Russian Federation and foreign states to perform the flight (landing, overflight) by international (internal) airlines for Russian and foreign carriers;
 - (2) organize aircraft maintenance of Russian and foreign carriers at landing airports (return flight);
 - (3) track aircraft position.
 - Certificate of Compliance for providing cargo maintenance (including dangerous cargo) at the airport Ulyanovsk-Vostochny at domestic and international air transportation;
 - License to perform space activities, namely, transportation of space technology and rocket fuel components.

Volga-Dnepr pays much attention to the training of personal, including flight and technical staff. According to the requirements of aviation safety for the transport of dangerous goods the aircraft captains, loadmasters and senior engineers (technicians) have the necessary certificates authorizing the conduction of activities in the atomic energy field for the flight and technical staff and on ground handling operations of dangerous goods. At the basis of the Aviation Training Center a simulator of An-124-100 aircraft has been designed, manufactured and put into operation, which allows flight staff training and modeling of flight to any airfields and also of adverse weather conditions and possible technical failures during flight operations.

Air Transport Operations Center of Volga-Dnepr performs daily non-stop monitoring of aircraft traffic by means of modern communication and qualified staff responsible for air navigation, technical, ground support of the flights. When interacting with airport security services for the transport of dangerous goods the necessary set of measures aimed at the physical protection of special cargo from the moment of its arrival in the airport until the departure of the aircraft is provided. We also offers the optimum routing to provide the maximum safe delivery of nuclear materials:

- avoid crossing the airspace of third countries,
- avoid crossing densely populated places and industrial facilities.

Any cargo goes through the technical expertise performed by load planning specialists of Volga-Dnepr before being transported. At the examination, based on the cargo stated characteristics and data, the decision on the aircraft type able to transport this cargo, on options for transportation, on the type of special loading equipment required for loading and unloading is taken, as well as the recommendations for the cargo safe transport are made. The project of TUK-145/C aircraft transportation from Vietnam to Russia, under RRRFR program, can be an example of such examination.