

OPTIONS FOR REDUCING ENVIRONMENTAL BURDEN OF SELECTED AIRPORT

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This article discusses the overview of the environmental burden of airport operations, especially at the Prague Airport - Ruzyně. The publication deal about the adverse effects of environmental contaminants by air and legislative standards in a particular field describes the negative impact of the airport to its surroundings and indicates the possibility of preventing them.

K e y w o r d s: airport, environment, ecology, noise, emissions

1 INTRODUCTION

Since the beginning of its existence, people were fascinated with flying creatures which, with amazing ease, again and again rose from the ground, and for eons ruled the sky. People tried to imitate this movement and today air travel is already an integral part of modern life of 21st century.

But everything has its pros and cons. Although the aviation is far from being the biggest polluter of the environment its implications can not be ignored. Increasing the number of flights, more airports, more bigger and massive planes, all of this leads to higher noise levels and this effect extends further from the airport. Aircraft engines, like any other engines burning the fossil fuels produce pollutants that affect the conditions of life on the Earth. The influence of these conditions is manifested directly as air pollution, and indirectly, by acting on the physical chemical state of the upper layers of the atmosphere. These are most important examples of pollution, and problems the aviation has to deal with, are more than enough.

My article is devoted to the environmental stress that the Airport Prague - Ruzyně causes to its surroundings, adding the general perspective on environmental pollution caused by aviation and other factors closely related to the topic.

The increasing volume of waste and pollution in the world remind us that it is time to focus on the topic of environmental protection such as in my work in the field of aviation.

2 ROLES AND PLACE OF AN AIRPORT IN AVIATION

Airport is a place where users of air transport (passenger, the product carrier) in the widest range of services meet the individual entities that are involved in this process. It is where a transport begins and ends, and there is an important decision to be made on quality and efficiency. At the airport, coordination takes place between the main providers of air transport - by an Airline Operator, an Airport Companies and the Air Traffic Control organization.

2.1 Functions of the airport

By strict definition of an airport from traffic point of view says, that the airport fulfills the following functions:

- Starting and ending point of the air transportation process
- Transfer between land and air transport
- Point of transit of lines and transfer / reloading between airlines (transfer)

To fulfill its functions the airport, are equipped with runways (runway system), taxiway (taxiways), maneuvering and parking space for aircraft (apron, ramp), check-in buildings for passengers and goods (passenger / cargo terminals), administrative buildings, equipment maintenance and repair of aircraft (maintenance), equipment for ground handling (handling), fire and emergency services (fire-fighting and rescue). A number of airports in their area are equipped with a variety of commercial zone. [1]

3 KEY FACTORS AFFECTING ENVIROMENT BY AIRPORT

Noise belongs to the most significant negative effect of aviation, depending on whether the aircraft moves along the ground or in the air. Noise is an unwanted sound that causes unpleasant feeling or disturbing sensation with the generally harmful effects. The noise is closely related to supersonic bang and vibration - vibration of vehicles. To the second most serious problems of air transport are pollution of water, earth and air by nearby airports, air pollutants as a result of incomplete combustion in internal combustion engines of aircrafts, oil leakage and production of waste.

Among the most adverse consequences of aviation are accidents when by incident large numbers of passengers get killed, since chances of survival in this mode of transport are almost zero. But the good thing is that such accidents do not happen very often, and from the environmental point of view, the adverse impact of such accidents is limited in scale usually.

These negative impacts are affected by several factors:

- Way to drive a way of keeping the aircraft
- Routing of aircraft

- The technical condition of aircraft
- Method, technique and organization of air traffic management
- Discipline of aviation participants
- Weather
- Distance to the airport from the communication [1]

4 LEGISLATION GOVERNING MATTERS OF ECOLOGY IN AVIATION

Current legislation in the field of environmental protection is covering almost all the essential elements of the environment and also covers the prevention of pollution and damage to these components. Similarly to other developed countries of the world, in Slovakia is a principle of sustainable development seen as one of the key principles of community development too. It is such a development, which allows meeting the needs of present generations without jeopardizing the rights of future generations to meet their needs. Right to favorable environment is also provided in the Constitution of the Slovak Republic, Article 44 says "everyone has the right to favorable environment, everyone is obliged to protect and enhance the environment and cultural heritage, and no one may, beyond the limits prescribed by law, threaten or damage the environment and natural resources."

4.1 Air regulations

Flight rules based on the standards and recommended practices attachments Convention on International Civil Aviation and documents, approved by ICAO in the Slovak Republic are called the letter L and numbers.

4.2 National Environmental Action Programme of the SR

The Government Resolution of 14 May 1996 approved the National Environmental Action Plan (NEAP I). For the period of the NEAP I realized a considerable amount of legislative measures, policy, and investment, organizational and educational nature.

In the field of environmental law, there have been developed and entered into force generally binding regulations aimed at protecting the ozone layer, climate protection, conservation and rational use of waters, territories and the generic nature and landscape protection, access to information on the environment, greening of agriculture and nuclear safety etc. At the different sections were taken conceptual and strategic documents, such as the Programme of Action for the Environment and health of inhabitants of Slovakia, Slovak Energy concept, Program to reduce greenhouse gas emissions, Waste management plan, Concept of organic farming and so on. [1]

5 PRAHA - RUZYNE AIRPORT

Prague Airport, Inc. is part of the Czech Aeroholding, Inc. The company covers the state-owned companies operating in the field of air transport and related ground services.

Prague Airport, Inc. is the operator of the most important international airport in the Czech Republic and the largest new EU member states, located on the northwest edge of Prague called Ruzynska plain at an altitude of 380 meters, only 12 km from the center of the capital. This effective area is the area of interest since 1929 and particularly since 1937 when the airport opened for air traffic. The then the airport area was 108 ha, of which the government has issued a purchase agreement on 29.3.1929. Current the airport area is 905 ha, of which the movement area, utility communication system and parking occupy about 215 ha. The airport is divided into two areas, southern and northern built in 1937 and 1968. Both campuses are located in nine estate areas. They are operationally and efficiently interconnected systems of runways, taxiways and runways part of airport communication system. The airport has about 600 buildings.

In 1956 it was decided about so called 2nd Construction of the airport that its scope was until then the largest in the postwar period. Involve the extension of the runway and the running system, construction of check-in terminal building for air traffic control, training of crews and large-scale hangar F for the needs of CSA. Ramp terminal was put into operation 15.06.1968; additional objects were gradually put into service until 1972.

5.1 Environment Airport Prague – Ruzyně

Flight operations and activities associated with it, affect the environment of airports and their surroundings in a similar way, as large industrial enterprises. Airport as a source of negative impacts on the environment is perceived more sensitive and more intense, particularly due to everyday personal experience with aircraft noise, which is rated as one of the worst impacts on the environment and people's living comfort.

The scope of the territory which is affected by airport can be fairly well delineated. Activities related to the operation of the airport are almost consistent processes, and therefore can be well chosen environmental policy of the airport operator and its rigorous enforcement of its other users to eliminate negative impacts to acceptable levels.

Ruzyně airport is surrounded by residential buildings located at a relatively small distance. In the southern direction are Hostivice and Jeneč, westward villages Dobrovíz and Hustouň. North of the airport lies the village Kněžves, Tuchoměřice part of Prague 6 - front Kopanina. The airport is adjacent to the southeast settlement Dědina. The area, which may be affected by

the operation of the airport, is much broader and includes the local district of Prague 6 - Řepy, Ruzyně, Nebušice, Lysolaje, Suchbátka and community Pavlov, Středokluky, Státnice, Únětice and Horoměřice.

Along with the development of the airport, there was a need for solutions to environmental issues. One of the first projects to be implemented in 1993, was the preparation of documentation for assessing the environmental impact of development options Ruzyně airport land use plan by 1992. Despite initial difficulties they managed to form a team of specialists who are able to assess the impact of airport development on the environment under the surface of the land use planning, especially in situations where not available, some comprehensive information about the existing state of the environment in the wider vicinity of the airport. Documentation of this project was later used as an objective basis for the opinions institutions that reflect the spatial development.

Another project was prepared in connection with the preparation so called 4th Ruzyně airport Construction during the year 1993. Because from the beginning was intended to provide funding for construction of one of the major European banks, has a requirement for an environmental audit processing area, a dedicated area in the North 4th Construction, a reputable foreign company.

Invaluable to this audit was in 1996 when it was processed so called environmental audit of the entry airport operations, including risk analysis, pollution of the ground. [2]

6 OPTIONS FOR REDUCING NEGATIVE IMPACT OF AIRPORT OPERATION ON ECOLOGY

Noise or emissions generated during flight have a direct impact on the population, and thus environmental burden caused by air, is seen mainly in airports and their immediate surroundings. Therefore, it is still important to seek new ways of reducing negative impacts of aviation. Environmental impacts around the airport are usually the main reason that limits the expansion of airport capacity. Air transport pays substantial attention to ecological problems such as the manufacture of engines quieter and more fuel-efficient aircraft, and many application procedures and measures to reduce the impact of environmental nuisances.

6.1 The problem of noise

There are a number of measures and procedures that limit the noise and deal with its negative impacts. The basic tool is the limiting noise source, i.e. reduce aircraft noise. The International Civil Aviation Organization ICAO introduced the noise category. Aircraft are classified according to the noise they produce and which is measured in three ways. This classification is an essential component of all schemes; airports use it as motivation to reduce noise.

6.2 Leakage of operating fluids

Pollution can be prevented in two ways: by using eco-friendly de-icing fluids and spray them and capturing and cleaning in wastewater and sewage precipitation. In this way can be the impact on the environment significantly reduced. Therefore, the airport constructed a special standing, where used de-icing fluid are collected. Similarly are captured the liquids that are sprayed on airfields. Investments that airports are making for the treatment of water are very high, but they are necessary for their operation. Increased attention is given to the storage and handling of aviation fuel, where can be a problem with leakage of LPH and soil contamination.

6.3 Harmful emissions

With the development of air transport and its operations there will be need to pay attention to the design of aircraft preventing pollution or reducing the production of harmful emissions. Emissions of nitrogen oxides can be reduced by burning at lower temperatures by optimizing the ratio of air - fuel. Limitation of sulfur trioxide and sulfur dioxide can be achieved by desulphurisation of fuel. Gaseous and liquid fuels can be desulphurised by special technologies or by using hydrodesulfurized catalysts. [1]

7 CONCLUSION

Environment is all around us, we are engaged with it in mutual relation. Unfortunately, it seems mostly as if we did not know about it, and treat our environment with indifference. Our environment is already polluted and destroyed and it is very difficult to improve it.

It is therefore necessary to begin care about environmental protection and joint efforts to prevent and if possible completely to stop the pollution of our environment. Environmental protection includes all human activities serving to protect the natural and artificial components of the country. Environmental problems are global.

I am glad that also through this work I can inform people about environmental pollution but also offer opportunities how to avoid such negative effects.

My work helped me to understand and to learn new facts about ecology and pollution caused not only by aviation.

BIBLIOGRAPHY

- [1] HARŇÁK M: Ekológia letísk, Bakalárska práca, 2010
- [2] <http://www.prg.aero/cs/o-letisti-praha/o-letisti-praha/>

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