

Consideration elements for a legislation on the airport noise: The Italian experience

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INTRODUCTION

The management of the airport noise in Italy is based on a specific regulation that takes into account also the Italian morphologic characteristics of the territory and the high urbanization which do not allow to have wide free areas to be used for the development of the airports.

The Italian law which rules the noise caused by the air transport has to manage several requirements, i.e. the needs of the inhabitants who live near the airports, the development needs of the airport traffic, which generally causes also the growth of the airport infrastructures, the possible limitations to the territorial planning near the towns.

As a consequence, the related law is quite complex and it is proved by the big amount of the Italian decrees on this subject and by the fact that it has taken a long time to get a full capacity.

The national legislative approach is based on different lines of action, concerning the characterization of areas close to the airport, with noise limit values fixed, the definition of measurement methodology and anti-noise procedures, the duty of utilization of monitoring system, the classification of the national airports on the basis of the noise let out on the surrounding areas, the duty of adoption of reclamation measures in case of the overcoming of the limits, the restrictions of the air traffic at night.

ITALIAN FRAMEWORK RULES

Over the years air transportation and the related air movement have become more and more huge and a specific regulation must be adopted to manage the item in a strategic and sustainable way according also to the growth of the towns and the needs of the population.

In Italy, two years later the issue of the framework law n. 447 of the 1995 on acoustic pollution, several decrees have been published in order to make operative this law.

The entire Italian legislation has got the aim to get the following lines of action:

- characterization of areas close to the airport, in order to fix noise limit for each area according to the different uses of the areas;
- definition of specific measurement methodology of the air transport noise;
- definition of anti-noise procedure for each airport which must be respected by airplanes during taking off and landing phases and during land operations;
- duty of utilization of monitoring system in continuous of the airport noise in order to guarantee and check the respect of the limits for protecting people, controlling noise let out by the airplanes, verifying the actions achieved against noise;
- classification of the national airports on the basis of the noise let out on the surrounding areas;
- duty of adoption of reclamation measures in case of the overcoming of the limits;

- restrictions of the air traffic at night.

All the above lines of action are included into the following decrees.

- Decree 31/10/97 on Measurement methodology of airport noise;
- Decree n.496, 11th December 1997, on regulations for the reduction of acoustic pollution caused by civil aircrafts;
- Decree 20/5/99 which defines criteria for the design of monitoring systems for controlling acoustic pollution levels close to the airports and criteria for the airport classification related to the acoustic pollution level;
- Decree 3/12/99 regarding anti noise measures and respect areas in the airports;
- Decree n.476, 9th November 1999, on the ban of air traffic at night.

According to these decrees, each Italian airport devoted to civil transportation must provide a set up of a continuous monitoring system around the airport area able to get possible overtaking of fixed limits connecting this information with data and flight path of the aircraft which has generated the overtaking.

This measure allows to control the acoustic climate around the airport areas and allows to impose economic sanctions if the fixed limits or the anti noise measures are not respected.

Moreover, each airport must constitute a Commission whose duties are the followings:

- classification of the airport according to the acoustic pollution produced, on the basis of the following parameters: extension of the airport area, extension of the three acoustic areas, extension of the residential areas which are into the pertinence zones, house density in each pertinence zone. On the basis of these parameters it is possible to get indices which allow to classify the airport;
- provide the anti noise measures for the airport on the basis of general criteria of the Italian decrees; the main objective is the optimisation of the noise aircraft noise at land in order to safeguard as best it is possible the exposed population;
- provide the definition of the three pertinence zones as requested by the specific decree 3/12/99, according to the different noise limit established by the decree itself.

Moreover, it is the duty of the airport managing Company to identify and to propose to the Municipality where the airport is located a noise reclamation plan, whereas it will be duty of the Municipality the adoption of the plan and its adaptation according to the Municipality acoustic reclamation plan as stated by the framework law n. 447/1995 on acoustic pollution.

The last act of the airport regulation is the restriction of the air traffic at night, except for medical or emergency or Italian State flights, or if there is a specific Ministerial authorization.

EXPERIENCES

Since 1997, when the first decree on air noise was published, each airport has worked with the above said aims. During these ten years, many experiences have been carried out, both positive and negative, useful to analyse the legislation itself.

Particularly, for some of them the development of the airports and their infrastructures in a sustainable way, increasing the value of the airport, as a power of economic and social development, respecting the territory and improving the environmental conditions, has represented the main objective.

This is the experience of the Bologna “G. Marconi” airport, which has evaluated the actions for reducing noise in a balanced approach, known, at now, at world level.

The elements examined have been the following:

- Technologic development;
- Procedures of flight;
- Airport infrastructures;
- Acoustic monitoring;
- Use of sound adsorbing barriers;
- ISO 14001 certification;
- Acoustic zoning;
- Environmental communication.

All of the elements of the balanced approach have been managed in a participative way, taking into account the input of the all stakeholders involved in the building up of the G. Marconi airport.

The aim has been to share the principles of sustainability like the following:

- Balance between the law for noise reduction, need of flight security, and objectives of airport and air space capability;
- Effective politics for land use around the airport area and for land-side accessibility in order to reduce local emissions;
- Balance between disturb reduction, economic aspects and free competition, protection of employment;
- Scientific evaluation of local source of atmospheric pollution in order to understand reasons and responsibilities and realistic attribution of mitigation duties;
- Flight path and procedures which make more efficient the use of the air space, shortening the distance in order to reduce consumptions and global emissions.

The International Airport of Naples represents another good experience. According to the Italian law, the Commission had realized the main objectives as:

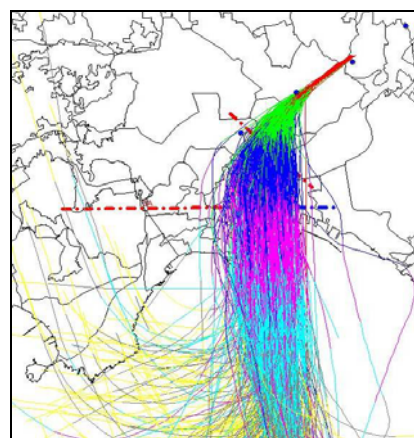
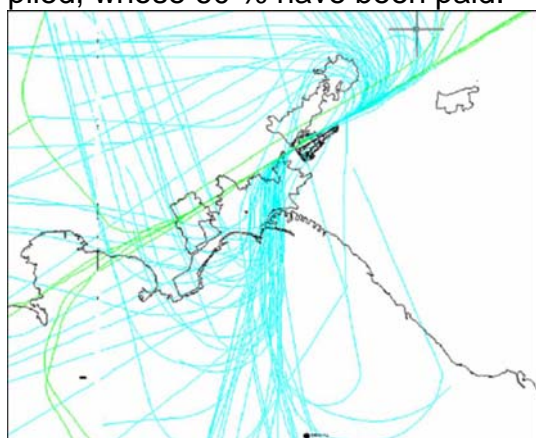
- Definition of the noise procedures;
- Acoustic zoning;
- Indices of acoustic classification of the airport;
- Achievement of a noise monitoring system;
- Collection of economic sanctions.

The zones of Capodimonte, Vomero, Posillipo, characterized by a high density of population, are nearest the airport, and they are interested by take off and landing operations (Figure1).



Figure 1: Airport of Naples and the areas interested. Source: Noise Airport Commission

The noise abatement procedures and the administrative sanctions, started in 2006, avoid the high dispersion of the routes of the airplanes in the areas mentioned above (Figures 2 and 3), with a percentage of procedures respected that grown up from 26 % in May 2001 to 97 % in May 2007. More than 5,000 sanctions have been applied, whose 60 % have been paid.



Figures 2 and 3: The situation before (on the left, Figure 2) and after (on the right, Figure 3) the application of the noise abatement procedures. Source: Noise Airport Commission

The airport of Milano Malpensa has carried out an experience regarding the health effects associated with exposure to aircraft noise. The airport was included in the project HYENA (Hypertension and Exposure to Noise near Airports), developed in 2003-2006 period. The project aim is to assess the impacts on cardiovascular health of noise generated by aircraft and road traffic.

In particular, two of the specific objectives are the analysis of the exposure-response relationship in adults between long-term exposure to airport related noise and high blood pressure and the analysis of the impact of aircraft noise on stress hormone levels. The research includes cross-sectional studies near six major European airports: Germany (Berlin Tegel), Italy (Milano Malpensa), Greece (Athens), Netherlands (Amsterdam Schiphol), Sweden (Stockholm Arlanda), United Kingdom (London Heathrow).

A total of 4,861 persons between 45 and 70 years old, who have lived at least 5 years near the selected airports, have been selected using noise contours related to the acoustic characterization of the airports. In Italy the study, coordinated by ARPA Piemonte, in cooperation with ASL Novara, ASL Varese, ARPA Lombardia, had in-

involved 12 Municipalities, with 753 persons selected from different aircraft noise exposure categories, in order to have a wide range of exposures. For the assessment of the noise exposure and health effects the blood pressure and stress hormones (cortisol in saliva) were collected and investigated.

Some interesting results are:

- the percentage of persons affected by hypertension in the areas analysed is, respectively, 48.8 % in the UK, 54.6 % in Germany, 51.9 % in the Netherlands, 52.0 % in Sweden, Greece 57.0 % and 52.1 % in Italy. These values are greater than the data, up to now, published;
- there was a statistically significant relationship between exposure to noise, considering air and road traffic, and the risk of hypertension;
- considering the A weighted noise equivalent level of 1 minute (LAeq1min) and 15 minutes (LAeq15min), in night-time noise exposure, an increase in blood pressure was observed over 15 minutes intervals in which an aircraft event occurs.

The HYENA study, which is the first multicenter research designed to assess the effects of exposure to aircraft and road traffic noise on blood pressure and cardiovascular disease, has confirmed the presence of the effects of long-term noise exposure on the prevalence of hypertension and the acute effects analysed in night-time exposure.

STATE OF ART

During these ten years, since the publication of the framework law n. 447 on acoustic pollution, the environmental acoustic Commission about air noise were established in all national airports, in different periods and with different progresses reached in the activities carried out.

Particularly:

- the definition of the airport area, which represents the most important act of planning, able to allow subsequently the optimisation of the extension of the considered area and the population involved, was defined by the infrastructure in percentage of 60 %;
- 30 % of the airport infrastructure have started a noise monitoring system, in some case fully operative, in other case in the phase of start up;
- the noise abatement measures were defined only in few airports;
- the definition of the three areas according to the different limit values established by law was carried out by three airports;
- the indices able to classify the airport were identified only by an infrastructure;
- there is any Noise Containment and Abatement Plan for the air infrastructures.

Positive elements

Even though in presence of a complex legislative system, there are many facts, undoubtedly positive, which may suggest interesting proposals, i.e.:

- the possibility, supplied by the law, to develop and to share the process with the stakeholders, especially with the Local Administrations, even though this may introduce more difficulties in the processes;
- the characterization of the territory, where the presence of the airport infrastructure is undoubtedly a problem, searching a balance between sustainable environmental impacts and the possibility of a future growth of the infrastructure;

- the continuous control of the noise emissions allowed by the monitoring system;
- the possibility to inform the community, using the monitored data, about the noise characterization of the area, through web site dedicated, reports or newsletters;
- the application of economic sanctions towards air companies, in the presence of the non-observance of the abatement noise measures, causing excessive noise emissions. The amount may be used to projects noise abatement plans and to achieve a better acoustic quality of the area close to the airport.

In Italy the implementation of the legislation system has allowed, in a few years, to create specific acoustic competences, especially in the air traffic noise, permitting the development of the specific topic, also it has allowed to define, with the cooperation of the technicians working in the airport managing Companies and in the Local Agencies for Environmental Protection, instruments and methodologies for the continuous noise monitoring, making the methods of acquisition, analysis and management of the noise data more accurate and appropriate.

Critical aspects

The enforcement of the national law underlines also the problems and the critical aspects existing, i.e.:

- in some experiences the presence of many local municipalities which emphasizes the own interests, due to the complexity of the territory, inside Noise Airport Commissions, causes conflict of interests and delay in the activities, but also a chance for an implementation of the different hypothesis proposed by the administrations;
- another reason of conflict inside working Commissions is the obligation to share all the choices, regarding the input noise data for the mathematical program utilized, i.e.: flows and entities of air traffic, airplanes paths, stops of airplanes, technical characteristics of the airplanes;
- the utilization of an acoustical air traffic noise parameter, L_{va} , which is different from environmental noise parameter, L_{eq} , using to evaluate the acoustic classification of the areas close to the airport, causes difficulties, especially drawing comparison in boundary situations and in presence of actions belonging to the different policy makers;
- the insufficient knowledge of the distribution of the population does not allow a correct and adequate valuation of the people exposed to the air traffic noise;
- the need to improve studies on the effects of noise exposure on human health;
- the lack of a deadline about the duties provided by law and the absence of the economic sanctions creates delay in the process;
- the implementation of END 2002/49/CE, carried out in Italy by the Decree 194/2005, makes changes in different aspects regarding the current national law, for instance the use of new acoustical parameter L_{den} .

CONCLUSIONS

According to the Italian national legislative actions there are some airport experiences which can be shared among the other Italian airport or to foreign Countries.

Particularly, when the aim to develop the airports and their infrastructures in a sustainable way, increasing the value of the airport, as a power of economic and social development, looking also at the territory and improving the environmental conditions has been respected.

Especially, in one of these experiences, the activities carried out essentially involving Companies, with specific meeting, with information towards new operators, with the involvement and participation of the pilots and with the presence of economic sanctions, have allowed to obtain, in two years, the respect of the noise abatement measures with a percentage of 97 %.

In another experience, the implementation of some aspects provided by the European Directive 2002/30/CE, which introduces duties and procedures for the operative restrictions in order to control the noise airport emission in the Community, with particular reference to the idea of “Balanced Approach”, has been realized. Many activities were carried out in order to achieve the control of the noise emissions: a continuous monitoring system, new flight procedures, structural modification and noise abatement action in the airport, but the more interesting action concerning the planning of the districts close to the infrastructure, in cooperation with the local municipality. In this case, in six years, a reduction of 5 dB of medium value L_{va} is achieved, with an increase of the air traffic of 50 %.

The research related to health effects associated with public exposure to aircraft noise carried out in Milano Malpensa surrounding is very important for the cooperation and the comparison with other airports situations, for the methods carried out and for the results obtained and it may be a reference frame for other studies and for a thorough analysis of the problem.

These experiences emphasize the aspects of an effective management, able to manage an important noise source without excessive penalization on it, searching a balance between noise abatement measures, needs of flight safety, targets about the growth of the airport infrastructure, effective policy of the land use of the territory close to the airport, mitigation of the annoyance, economic aspects regarding the competitive system and the security of the employment.

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