

THE DEVELOPMENT OF AIRPORT AREAS ACCORDING TO ENVIRONMENTAL PROTECTION FROM NOISE POLLUTION: THE CASE OF ROME CITY

PACS:43.50.RQ

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ABSTRACT

One of the principal causes of environmental acoustic pollution is the presence of airport infrastructures near urban areas because, as well known, the noise produced by planes is poorly tolerated by population. It is particularly evident in Italy where the characteristics of the territory, availability of spaces and orography, and the strong urbanisation determine many situations of proximity between airport and cities.

The Italian rules, considering these aspects, establish principles, criteria and procedures to limit the acoustic disease and the noise impact around the airports.

In Rome there are three airports: an hub, a civil and military airport and a little airport; these areas are delimited by 60 dBA isolevel inside which the building constructions are submitted to specific restrictions that limit the full management of the territory by the municipality.

The following contents show the present situation in Rome and near communes and the real possibilities to reach a balance between the environmental noise reduction around the airport infrastructures and the management of the territory and of the airport development.

ITALIAN RULES

With respect to the aim of this paper, the most interesting contents of the national regulations regards the needs to characterise three areas around the airport fixing noise limits and limitations of the territory use for each area:

- **A zone**, where the L_{VA} values are comprised between 60 and 65 dBA; in this area all activities are permitted;
- **B zone**, where the L_{VA} values are comprised between 65 and 75 dBA; in this area only agricultural, industrial and commercial activities are permitted; in case of presence of business building suitable measures of sound-proofing must be adopted;
- **C zone**, where the L_{VA} values are greater than 75 dBA; in this area only activities joined with airport operations are permitted.

These areas must be delimited by L_{VA} isolevel curves where the L_{VA} parameter is a planning index and it is not used to evaluate the people exposed to the noise

$$L_{VA} = 10 \log [1/N \sum_{j=1,N} 10^{L_{VAj}/10}] \text{ dBA}$$

The L_{VA} value depends on the days of observation time (at least 21 days divided into three most significant weeks in different period of the year), the number of aircraft operations and the SEL of each operation; it is calculated for the day ($L_{VA,d}$) and for the night ($L_{VA,n}$), then it is evaluated

the L_{VAj} for each day composed by the two values, and, then, it is possible to have the L_{VA} value:

According to the above indications, it will be necessary to institute for each airport a Commission which must proceed to the definition of the three areas A, B and C of the infrastructure surroundings. This aspect is very delicate because it obligates Communes to limit use destinations of their territory comprised in the aforesaid areas and to divide in acoustic zone the territory adjacent with A zone (the most external one regarding the area of the airport and therefore with more bottom limits) compatibly with the levels of allowed noisiness permitted. It must be keep in mind that in C zone it is possible to carry on only the activities closely connected with the use of the same infrastructure; in B zone it is possible to do productive activities or trade or agricultural ones, but also offices in case measures of acoustic isolation are adopted; in A zone, instead, it is not imposed any limitation. These conditions consequently involve, for the territory comprised in A zone, the possibility to expose the population to levels of noise comprised between 60 and 65 dBA, while for the areas A and B the necessity to co-ordinate the town and territorial planning instruments with the plan of development of the airport. This can cause situations of disagreement among various instruments, in such a case, imposes a conference of services.

Moreover It will be task of the society of management of the airport to characterise and to propose to the interested Commune a plan of acoustic reorganisation and control of the produced noise, while it will be obligation of the Commune to include it in the plan of communal acoustic reclamation that it has to predispose in compliance with art.7 of the framework law on acoustic pollution n. 477/95.

AIRPORTS IN ROME TERRITORY

Three airports are present in Rome territory, each of them has the specific peculiarities below detailed:

1. Fiumicino – Leonardo da Vinci Airport is an international hub opened only to civil traffic. About 700 flights per day are operated, using three runways. The airport perimeter is located in two communes, Rome and Fiumicino, in a prevalently ground area, not intensely urbanized. The main residential areas are located in Fiumicino territory, where houses are generally used during summer period;
2. Ciampino – G.B. Pastine Airport is a civil and military airport; about 100 flights per day are operated using the only one existing runway; civil traffic is principally due to charter, commercial and business flights and it is about half of total operations. The airport is comprised in the Rome and Ciampino territories, in a strongly urbanised area where residential buildings are close to the perimeter of the infrastructure. As a consequence, the air traffic generates noise impact in various areas where people live, principally in Ciampino commune and then in some areas of Rome, situated under the landing route, and of Marino commune, situated under the take-off route.
3. Dell'Urbe Airport is an infrastructure opened to civil traffic, due to tourist, advertising and for pleasure flights, and to helicopter military traffic. It is located in a poorly urbanised extra urban area of Rome. About 100 flights are daily operated In this airport.

NOISE IMPACT

Some data about the noise impact of the infrastructures are presented In this paragraph; they are based on the actual state of art of the Commissions work.

The L_{VA} isolevel curves determined for the airports have been superimposed on territorial cartography characterizing the areas of the territory with L_{VA} values greater than 60 dBA (see fig. 1 and fig. 2).

The territory comprised on the whole into three areas, that is the territory defined as “neighbourhood of the airport”, is presented In the following tables.

1. Fiumicino

Tab.1 - Surface of airport noise areas (km ²)		
A	B	C
≈ 2700	≈ 2150	≈ 500

For the Fiumicino airport the total noise area is equal about to 5350 km².

2. Ciampino

Tab.2 - Surface of airport noise areas (km ²)		
A	B	C
≈ 3.8	≈ 2.5	≈ 0.6

For this airport the noise area is equal about to 7 km²

It is important to show that the airport area is about 2 km² and that the area of Ciampino commune is 11 km².

3. Dell'Urbe

In this case, the Commission work has not started yet, but measurements of noise levels show that the "neighbourhood of the airport", delimited by 60 dBA isolevel curve, is totally inside the airport perimeter, which has an area of about 1 km².

TERRITORY MANAGEMENT

As a consequence of the above framework, it is possible to point out that the most relevant impact in terms of diseases for the population is in Ciampino Commune; but the characteristics of the territory, the strong urbanization, the contemporary presence of other infrastructures as railway and important roads, make less difficult its management. In fact, the environmental noise is already significant due to the above sources and to urban traffic, so the noise classification of the territory by the municipality is generally in accordance with the noise zones of the airport.

The situation of Fiumicino and dell'Urbe airports is different because they are located in poorly urbanised areas and their noise impact imposes strong limitations in the development of the territory.

For example, on the basis of Italian law, near Dell'Urbe Airport it isn't possible to build residential areas or areas used for children or for sanitary ambient where noise levels must be less than 60 dBA, it is only possible to assign the territory band near the airport to commercial or business areas.

The same limitation is present close to the Fiumicino Airport but, in this case, the problem is amplified by the great extension of the airport noise area.

It is important to underline that the Italian rules impose to the Municipalities to classify their territory on the basis of the indications reported in the following table 3

Tab. 3 – Environmental noise limits (dBA Leq)		
Territory zones	Referring time	
	Day period (6 – 22)	Night period (22-6)
I Class - Protected areas	50	40
II Class – Prevalently Residential areas	55	45
III Class - Mixed areas	60	50
IV Class – Strong human activity areas	65	55
V Class – Prevalently industrial areas	70	60
VI Class – Exclusively Industrial areas	70	70

CONCLUSIONS

The above information confirm that the I, II and III classes cannot be set close to the airport area defined as "neighbourhood of the airport", therefore a careful planning by the municipalities is necessary to avoid the proximity of incompatible ambient that, later on, can cause complaints by the citizens and determine an economic effort for the local administration to adopt heavy reclamation measures, often difficult to realize.

In fact, at this moment, the first action to eliminate the noise impact for the population present in C area, close the airports, is the re-location of the living ambient, because other solutions can excessively penalize the airport activities.

Also the insulation measures for the buildings present in B area are particularly expensive, considering that, as it appears, they are very numerous.

In conclusion, it points out that the noise problem in our urban environments is manageable only by territory planning, preventive design of the development of the ambient where many noise sources/human activities are present, and careful integration of different municipal instruments.

REFERENCES

- S. Curcuruto, A. Franchi: "A complex legislation: the airport noise". Internoise 2000. Nice, Côte d'Azur, août, 27-30 2000.
- Report on noise pollution in Lazio Region, ARPA Lazio, 2002.
- IV° Congress on Airport and Citizens. Proceedings. Rome, December,7 2001
- Work of Fiumicino and Ciampino Airports Commissions

Fig. 1 – Noise areas of Fiumicino Airport