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ITALIAN LEGISLATION ON NOISE ASSESSMENT AND CONTROL

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ABSTRACT
The Italian statutory law on noise pollution, issued by the Parliament on 26th October 1995 and in force since 1st January 1996, assesses and controls the noise in order to assign specific competences to the municipalities, to the local authorities, to the regions and to the central administrations. From then on the Italian Government has enacted regulations concerning: the assessment and the control of the industrial noise in not industrial urban areas; the noise levels allowed in different urban areas; the assessment and the control of the airport noise; the assessment and the control of the railway noise; the noise into the discos, pubs and from entertainments; the building requirements to reduce the indoor level of noise.

1 - INTRODUCTION

Italian statutory law on acoustic pollution, issued on the 26th October 1995, establishes the fundamental principles on both outdoor and indoor environmental protection from acoustic pollution. The main definitions of this law are:

- emission limit values: the greatest noise value given out by a source, measured near the source;
- immission limit values: the greatest noise value introduced by one or more sources, measured near exposed people;
- attention values: noise values potentially dangerous to human health;
- quality values: noise values to be achieved for reduction of harmful effects on human health.

These values are defined on the basis of the day period, the kind of source and its of use.
The State competences are:

- Determination of the techniques for the acoustic pollution testing, keeping the characteristic of the noise emitted by transport infrastructures.
- Acoustic requirements determination of sound sources and acoustic passive requirements of buildings and them components, in order to reduce the human exposure to the noise.
- Indications of criteria for planning, execution and buildings and transport infrastructures restructuring, in order to defend by acoustic pollution.
- Acoustic requirements determination of warning systems and refrigeration systems
- Acoustic requirements determination of sound sources in dancing or public show places.
- Long term action plan adoption in order to control sound emissions produced by the most important public transport like railway lines, subways, motorways and state roads, respecting the limits provided for every mean of transport.

- Determination of criteria in order to measure noise emitted by every kind of boat, and reduce acoustic pollution.
- Determination of criteria in order to measure noise emitted by aircrafts, and reduce acoustic pollution.

The Region competences are noise zoning according to laws in force in respect to quality values and province competence regulation about acoustic pollution
The Municipality competences are noise zoning according to laws in force in respect to quality values. Execution regulations issued for each sound source are:

1996	Decree on application of differential criterion for continuous cycle plants 11 /12/ 1996			
1997	Decree on methods of airport noise measurement 31 /10/ 1997	Decree on determination of sound source limit values 14 /11/ 1997	Decree on acoustic passive requirements of buildings 5 /12/ 1997	Decree on acoustic pollution abatement produced by aircrafts 11 /12/ 1997
1998	Decree on techniques about noise measurement 16 /3/ 1998	Decree on expert technician in acoustics 31 /03/ 1998	Regulation on railway noise 18 /11/ 1998	
1999	Decree on discos, pubs and from entertainments 16 /04/ 1999	Decree on airport noise monitoring systems 20 /05/ 1999		

Table 1.

2 - ITALIAN REGULATION ON NOISE AND ZONING OF URBAN AREAS

A government decree has been issued on 1st December 1997 regarding noise emission values by individual sources, territory classification from the noise level point of view and noise limit values for urban areas. Every municipality has to classify its territory according to the following Table 2:

Class I	in this class are all the protected areas where quiet is the main element. Pertain to this class hospitals, schools, parks, country residential areas.
Class II	in this class are all the areas are devoted to residential settling, with low inhabitant's density. In these areas there is only local traffic, no industries and only few commercial activities.
Class III	in this class the areas are called mixed. These areas are characterized both by local and passing traffic, with mean inhabitant's density, commercial activities, and offices but with no industries.
Class IV	in this class are the areas with high human activity, high inhabitants density, high road traffic, many commercial activities; these areas are near main roads, main railways or ports; in these areas may be as well few small industries
Class V	in this class are mainly industrial areas. In these areas are industries and very low inhabitants density.
Class VI	in this class are only industrial areas. In these areas are industries only; no dwellings are in these areas.

Table 2: Territory classification.

Every territory class has its own noise emission limit by any source but roads, railways and airports. The emission limit values are in the following Table 3.

Territory classes	Reference periods	
	Day-period (06.00-22.00)	Night-period (22.00-06.00)
Class I	45 dB(A) L_{eq}	35 dB(A) L_{eq}
Class II	50 dB(A) L_{eq}	40 dB(A) L_{eq}
Class III	55 dB(A) L_{eq}	45 dB(A) L_{eq}
Class IV	60 dB(A) L_{eq}	50 dB(A) L_{eq}
Class V	65 dB(A) L_{eq}	55 dB(A) L_{eq}
Class VI	65 dB(A) L_{eq}	65 dB(A) L_{eq}

Table 3: Noise emission limit values.

The noise emission values of table 3 are to be respected by any not mobile source and are to be measured within the area where the source is, nearby buildings, dwellings or places where people usually stay. Besides the noise emission limit values there are for any area as well noise immission values no to be exceeded altogether by all the noise sources acting in the area in every point of the same area. The emission limit values are in the following Table 4.

Territory classes	Reference periods	
	Day-period (06.00-22.00)	Night-period (22.00-06.00)
Class I	50 dB(A) L_{eq}	40 dB(A) L_{eq}
Class II	55 dB(A) L_{eq}	45 dB(A) L_{eq}
Class III	60 dB(A) L_{eq}	50 dB(A) L_{eq}
Class IV	65 dB(A) L_{eq}	55 dB(A) L_{eq}
Class V	70 dB(A) L_{eq}	60 dB(A) L_{eq}
Class VI	70 dB(A) L_{eq}	70 dB(A) L_{eq}

Table 4: Noise immission limit values.

The noise immission values of table 4 are not for roads, railways and airport within their pertaining areas, where these transport infrastructures have their own limits to respect. Outside their pertaining areas roads, railways and airport have to respect the noise limits fixed for every area according to the table 4, altogether with any other not mobile source of noise acting there. The decree issued on 1st December 1997 provides also noise limit values, called attention values, namely values no to be exceeded for long term. The attention values are those of table 4 when referred to the canonical period or the same increased by 10 dB for the day-period and by 5 dB for the night-period when referred to one hour. Long term observation could mean a seasonal period or a year period. In case of excess of the attention values action plans have to set up. Target of the action plans is the attainment of quality values reported in Table 5:

Territory classes	Reference periods	
	Day-period (06.00-22.00)	Night-period (22.00-06.00)
Class I	47 dB(A) L_{eq}	37 dB(A) L_{eq}
Class II	52 dB(A) L_{eq}	42 dB(A) L_{eq}
Class III	57 dB(A) L_{eq}	47 dB(A) L_{eq}
Class IV	62 dB(A) L_{eq}	52 dB(A) L_{eq}
Class V	67 dB(A) L_{eq}	57 dB(A) L_{eq}
Class VI	70 dB(A) L_{eq}	70 dB(A) L_{eq}

Table 5: Noise quality values.

3 - ITALIAN REGULATIONS ON AIRPORT NOISE

The general law against noise pollution provides specific actions to assess and to control the airport noise due to civil aircraft as:

- to establish methods of measurement of the airport noise

- to define general criteria for anti-noise procedures in landing and in takeoff
- to classify the airport according to the level of noise pollution
- to fix planning criteria for the development of urban areas around the airports
- to define general criteria for the design of the airport noise monitoring systems.

Such actions have been enforced in the decree of the Minister of the Environment acting in concert with the Minister of Transport issued on 31st October 1997. This decree does not take into account noise due to emergency or rescue flights. By the 31st October 1997 decree has been defined the indicator L_{VA} to be used to evaluate the airport noise level for noise mapping and acoustical planning. This indicator is a long term one and is evaluated as mean value of the values obtained during 3 weeks where the number of flights is higher, chosen in order to have one week for each of following periods 1st October − 31 st January, 1st February − 31st May, 1 st June − 30 September. The indicator is based on *SEL* evaluation; the *SEL* value of the night events is increased by 10 dB.
On the basis of the indicator L_{VA} values, three areas are defined around every airport:

- A area between the closed line of value 60 dB(A) and the one of value 65 dB(A); in such an area can be built soundproof dwellings;
- B area included between the closed line of value 65 dB(A) and the one of value 75 dB(A); in such an area are admitted only industrial activities and the buildings are to be soundproof as well;
- C area, the nearest to the airport, where the value of the indicator L_{VA} is greater than 75 dB(A); in such an area are admitted only the buildings pertaining to the airport itself.

Local commissions consisting of representatives from local authorities, pilots and Civil Aviation Authority define the areas A, B and C. The commissions determine the areas A, B and C by using long term airport noise modeling and the anti-noise procedures. Municipalities have to take into account the results of the work done by the local Commissions into their general plans of urban expansion. Another important law in the field of the airport noise is the decree on the monitoring systems issued on 20 May 1999. Such a decree contains minimum requirements for airport noise monitoring systems and criteria for a right placing of the stations to assess the airport noise. General criteria to be used in defining anti-noise procedures have been established by the decree issued on 3rd December 1999.
With the aim to control the level of the noise and to improve the life quality of the populations living around the civil airports, Italian Government has issued a regulation pertaining the civil flights in night period (11.00 p.m. − 6.00 a.m.). In such a period are allowed only Government flights, emergency and sanitary flights and delayed flights. However on the basis of a request by the carriers and approved both by Civil Aviation Authority, regional and local authorities as well, can be authorized postal and other type of flights. The value of the night period indicator L_{VAn} evaluated in the vicinity of the most exposed dwelling must not exceed 60 dB(A). Chapter 3 planes according to the classification by the International Civil Aviation Organization must carry out these authorized flights. The regions where these authorized flights are carried out must report monthly to the Ministry of the Environment that the overall value of 60 dB(A) L_{VAn} has not been exceeded.

4 - ITALIAN REGULATION ON RAILWAY NOISE

In Italy is in force a regulation on the reduction of the railway noise. The general law against noise pollution provides specific actions to assess and control the railway noise as:

- to regulate the noise by the railway transport
- to establish methods of measurement of the railway noise
- to set up action plans to reduce the noise level
- to fix planning criteria for the development of urban areas around the railways.

The regulation on railway noise has been issued on 18th November 1998 by the Minister of the Environment acting in agreement with the Minister of Transports and has entered in force on 4th January 1999. According to the regulation the Italian railways are divided into two groups:

- Group 1: railways operative at the date of the enforcement of the regulation;

- Group 2: railways no operative at the date of the enforcement of the regulation

Group 2 is divided in two classes:

- railways with maximum speed less than 200 km/h;
- railways with maximum speed greater than 200 km/h.

Along the railways there are zones where noise levels by the railway itself are admitted (limit values). The limit values and the width of such zones vary according to the aforementioned groups and classes of railways. The limit values are different for day period (from 06.00 to 22.00) and for night period (from 22.00 to 06.00) as shown in the tables 6 and 7. In the table 6 are both the widths of such zones and the relevant outdoor limits for the railways in operation on 4^{th} January 1999

Group	Width of A zone	Outdoor day limit values within A zone	Outdoor night limit values within A zone	Width of B zone	Outdoor day limit values within B zone	Night Limit values within B zone
1	100 m	50 dB(A) L_{eq} schools and hospitals; 70 dB(A) dwellings	40 dB(A) L_{eq} hospitals; 60 dB(A) dwellings	150 m	50 dB(A) L_{eq} schools and hospitals; 65 dB(A) dwellings	40 dB(A) L_{eq} hospitals; 55 dB(A) dwellings

Table 6: Railways in use at the date of the enforcement of the regulation.

In the table 7 are both the width of the noisy zone and the relevant limits for the railways not in operation at the date of the issue of the regulation (group 2) with class of velocity a) (less than 200 km/h).

Group	Class of velocity a)	Width of A zone	Outdoor day limit values A zone in dB(A)L_{eq}	Outdoor night limit values A zone in dB(A)L_{eq}	Width of B zone	Outdoor day limit values B zone in dB(A)L_{eq}	Outdoor night limit values B zone in dB(A)L_{eq}
2	< 200 km/h	100 m	50 schools and hospitals	40 hospitals	150 m	50 schools and hospitals	40 hospitals
			70 dwellings	60 dwellings		65 dwellings	55 dwellings

Table 7: New railways with maximum speed less than 200 km/h.

Exposure limit values for noise by railways and widths of zones A and B are the same for existing railways and for the new ones with maximum speed less than 200 km/h. The only difference between them is: for new railways the exposure limit values have to be not exceeded since their entering into use. The exposure limit values for the railways in use on 4^{th} January 1999, must be attained by action plans to be implemented within 15 years beginning from January 2000. Higher priority is assigned to reducing of the noise levels in front of hospitals and schools both in A zone and B zone. In the table 8 are the width of the admitted noisy zone and the relevant limits for the railways not in use at the date of the issue of the regulation (group 2) with class of velocity b), (greater than 200 km/h. This table refers to the railways designed for the high-speed trains.

Group	Class of velocity b)	Width of the zone of the admitted noise	Day limit values	Night limit values
2	> 200 km/h	250 m	50 dB(A) L_{eq} schools and hospitals;	40 dB(A) L_{eq} hospitals;
			65 dB(A) L_{eq} dwellings	55 dB(A) L_{eq} dwellings

Table 8.

For these railways as well, the exposure limits values have to be not exceeded since they are entering into operation. The limit values for railway noise of the tables 6, 7, 8 are evaluated in front of the most exposed facade at the distance of 1 m and in correspondence of the point where the noise is higher. Outside the allowed noisy zones the railways have to respect the noise limit values established by the municipalities according to the national and regional laws. In case of excess of the fixed noise limits both inside the zones than outside them, the railway owners has to set up action plans to reduce the level of the noise in front of the most exposed facade of the buildings. When direct actions on the sources or along the propagation way of noise are not practicable or from the technical point of view or from the cost-effectiveness viewpoint and the outdoor limit values evaluated in front of the buildings are not attainable, then direct interventions on the buildings are allowed. These interventions of noise reduction must achieve the indoor limit values reported in the table 9.

Night period indoor value limit in L_{eq}	Night period indoor value limit in L_{eq}	Day period indoor value limit in L_{eq}
35 dB(A) hospitals	40 dB(A) dwellings	45 dB(A) schools

Table 9.

The values of the table 9 must be measured in the middle of the most exposed room, with closed windows and with the microphone at the height of 1,5 m above the floor. Apart from the schools these indoor limit values refer to the night period, the one which needs the higher noise abatement. The railways pertaining to the Group 2, when they go in use must attain the limit values of table 9, table 8 and table 7. According to the Italian General Law against noise, the railways owners, in case of excess of the limit values referred to in table 6, must allocate every year at least the 7% of their budget devoted to maintenance, for noise abatement actions. Higher priority is assigned to action plans regarding hospitals and schools in the zones A and B. After having implemented the aforementioned action plans, the railway owners set up action plans for the reduction of the noise levels in front of the dwellings. The limit values for the railways pertaining to the Group 1, the ones that were operative on 4th January 1999, must be attained by action plans that must be implemented within 15 years beginning from January 1999. After the implementation of those action plans will be implemented the ones referring to the dwellings within the A zone, in front of which the limit values are exceeded. The owners of the railways are responsible for the implementation of such action plans. The regulation on railway noise provides emission limits for new rolling stocks entering in use after 1st January 2002 and before 1st January 2012 and other lower limit emission values for the rolling stock entering into service after 1st January 2012.