



THE INTEGRAL FIGHT AGAINST THE URBAN NOISE. PERFORMANCES IN THE CITY OF LEON (SPAIN)

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E. García Ortiz, M. Fuentes Robles, J. Cepeda Riaño, G. Búrdalo Salcedo, M. de Barrios Carro, D. García de la Peña

University of Leon, High School of Industrial and Computer Science Engineering, Laboratory of Applied Acoustics, University Campus. 24071 – León Tel. Fax: +34 987 291777.

e-mail: acustica.lab@unileon.es

web: <http://www3.unileon.es/lab/acustica>

ABSTRACT

In the present communication different aspects that can include an integral fight against the urban noise, applied in this case are detailed to the city of Leon (Spain). The Laboratory of Acoustics of the University of Leon, has developed a series of actions, that as a whole they try to obtain a better acoustic comfort for his population, and that are described of very brief form, performances which they are or finalized or in phase execution outpost, or are of continuous development. The preparation of acoustic maps, characterization of insulations, levels of noise and vibrations, study of specific sectors, proposal of zone ZAS or control of acoustic limiters, can be mentioned among them. In order to conclude, during present 2007 the preparation of the Strategic Map of the city will begin.

INTRODUCTION

Nowadays the noise has happened to consider itself like one of the environmental polluting agents that must consider in all planning that contemplates the health, the well-being and the quality of life, like one of the objectives to obtain simultaneously with the economic and social development.

In the cities, consequently, the treatment that is due to give the noise is the one of an urban polluting agent, and, like so, integrated in the municipal mechanisms of protection of environment. The fight against the noise in the urban scope has acquired a great importance, and to her it is precise to dedicate average technicians and humans by means of integral performances, that we understand must include diverse coordinated actions to each other.

Of this form, a strategy can be designed that, at least, would have to include, like minimum:

- To evaluate the distribution of the sonorous levels in the city, the space and the time, establishing a distribution throughout the day and at night, by means of acoustic indexes. This implies the preparation of acoustics maps to the effect.
- This evaluation would have to contain the characterization of the zones and the more significant centers of noise.
- Planning of specific studies according to the zones and more important centers of noise.
- Adoption of measures to improve the detected situations.

These performances, like it is logical, they must be executed in a complementary way and without terms, since the city is something in constant evolution, for it, the plannings and setting in practice of measures to adopt should go adapting in a continuous way in the time.

PERFORMANCES IN THE CITY OF LEÓN (SPAIN)

In attached leaf a scheme can be observed that relates and details the different performances that have been executed in Leon until today, and which they are detailed next:

I) Development and application of Municipal Law on Noise and Vibrations.

II) Preparation of Acoustic Maps.

III) Characterization and analysis of sound insulations, transmission of noise and vibrations.

IV) Study of conditions of insulation and intelligibility in scholastic centers.

V) Installation and control of acoustic limiters.

VI) Study of specific sectors.

VII) Characterization and boundary of a Zone Acoustic Saturated (ZAS).

These groups of actions, executed from year 1995 by the City council of Leon, with the direction and technical development of the Laboratory of Acoustics Applied of the University of Leon, have come to constitute the nucleus of the integral fight against the noise in this city.

Next the most excellent characteristics of the different indicated performances are described.

I) Development and application of Municipal law on Noise and Vibrations.

The first Municipal law on Noise and Vibrations was approved in 1996 and supposed an authentic impulse in the planning of the actions against the noise in the city.

Later, and with the technical support of our Laboratory of Acoustics the municipal law of 2003 was published, that came to update and to modernize the previous one, adapting the exigencies contained in same to the evolution and the changes produced in the society.

Among others, and as a example, some excellent aspects are indicated next:

- Cataloguing of the establishments according to its licenses and schedules with the object of exigency in insulations.
- Maintenance of the necessity of the acoustic limiters.
- One details the declaration of ZAS, procedure and effects.
- With respect to licenses, the emission levels are specified that must be contemplated in the studies and projects.
- Exigency of previous evaluation and certification for new city-planning locations and new constructions.
- Obligation to certify the sound insulations previous to the license of occupation and opening of establishments.

II) Preparation of Acoustic Maps.

- ✓ In 1996 the preparation of the first Acoustic Map of the city of Leon was finalized.
- ✓ In April of 2001 the second Acoustic Map of Leon appeared, update of the previous one.

The most important aspects of these Maps are the following ones:

- Acoustic map of the city by grids (100 x 100 meters). A total of 916 points in diurnal period and 544 in nocturnal period.
- Acoustic map of the city by road networks. 88 streets and 408 points of measurement.
- Acoustic maps of detail of two specific zones of the city where a great concentration of the premises of nocturnal leisure is located.
- Acoustic map of the surroundings of the scholastic centers of the city.

As far as conclusions, we indicated only one small part of the same ones:

- The diurnal levels cannot be considered globally high, with a 30,5% of the surface of grids over 65 dBA of Leq. Nevertheless, in the nocturnal period, these acoustic levels are excessive, surpassing the 55 dBA in 60,4% of the zone.

- The regulation with traffic lights must be object of permanent consideration. The construction of public squares, roundhouses or places of free entrance would have a beneficial effect extremely.
- Just as in the previous case, it would have positive repercussion the arrangement of traffic by means of routes of unique sense, the control of the motorcycles, and, by all means the extension of pedestrian street.
- The short term solution of two problems that presents our city, from the road point of view; the first, the closing circumvallation round; the second, the accesses to the university Campus, not yet solved still.
- Finally, a special treatment deserves the nights of Thursday, Friday and Saturday, specially in the old zone of the city, where the high density of pubs imposes necessity of global actions is of extreme importance.
- The consequences coming from these Maps, fundamentally of the corresponding one to 2001, also contributed questions of importance in the elaboration of the Municipal Law of 2003, before mentioned.

III) Characterization and analysis of sound insulations, transmission of noise and vibration.

From 1996, and to date they come elaborating for the City council from Leon technical information on the characterization of sound insulations to aerial noise, as well as analysis of transmission of noise and vibrations.

These studies fundamentally go to verify the sound insulation in the establishments susceptible to originate high sonorous levels. In addition, and as it has been mentioned, also the transmissions of noise and vibrations in cases of special request on the part of the municipal organization are verified.

Its development has allowed to obtain the improvement in the acoustic conditions of those establishments, as well as to fulfill the requirement of the municipal norm, providing an essential technical base.

IV) Study of conditions of insulation and intelligibility in scholastic centers.

The first Acoustic Map allowed to know the circumstances that existed in the surroundings of the scholastic centers in the city, which concluded in a study made on its conditions of insulation and intelligibility.

Altogether 31 schools were considered, being made a sampling of classrooms in each one of them, which allowed to detail a set of measures to adopt for its better acoustic preparation.

V) Installation and control of acoustic limiters.

The application of successive Municipal laws demanded the installation of acoustic limiters in establishments with music emission, aspect of great importance to elevate the acoustic comfort of the residents.

On the other hand, from 1998, our Laboratory of Acoustics makes the control and verification of the installed acoustic limiters in establishments with equipment of sonorous reproduction, to the object to maintain, by means of its correct operation, emission levels that stay within acceptable limits.

As resulting from this action of inspection, in 2005 started up in Leon the Global System of Inspection of the Places of Leisure (SIGLO) that it allows, from the acoustic limiters, an inspection of this type of places by means of a telematic system, practically in real time.

VI) Study of specific sectors.

The best knowledge of the acoustic situation of the city provided by the noise maps, mainly from the elaborated one in 2001, lead to the decision to elaborate studies on specific sectors that had been revealed of importance was him case of the electromechanical factories and the premises of nocturnal leisure.

✓ Analysis of electromechanical factories.

Throughout 2003 and 2004 a complete study was developed on this sector in our city, which allowed to a good knowledge of the acoustic characteristics of its activity and of the used facilities and machinery, as well as of its repercussion in houses affected by the factories.

A data base with a total of 155 establishments was elaborated, of which 42 were analyzed of exhaustive form.

✓ Study of the leisure premises.

Similarly, during years 2003 and 2004, a study was carried out on the premises of nocturnal leisure that contains a data base of this type of the premises, located in the zones most characteristic of the city, included in the denominated "Old Zone", with a total of 358 establishments.

This data base connects with, specific on sound insulations to aerial other two noise and control of limiters, respectively, so that, can know the acoustic situation anyone of 116 establishments in which they have been made measurement of insulations and/or they have acoustic limiter.

With the results of this study, the City council of Leon has a tool, that it is updated permanently, that provides a complete knowledge to him of this sector, considered like most problematic from the acoustic point of view in nocturnal period.

VII) Characterization and boundary of a Zone Acoustic Saturated (ZAS).

Like new development of the Municipal Law, and like acoustic answer to the existing situation in a great zone of the city, to which already we have alluded, the "Old Zone", was made during the year the 2006 study corresponding to the possible characterization and boundary of Zone Acoustic Saturated (ZAS).

The conclusions of the study allowed the proposal of boundary of a ZAS that includes a total of 32 streets or sections, together with a Zone of Respect, surrounding to the previous one, with a set of 28 streets.

The average for the set of the ZAS can be indicated, as far as the Leq for all the nocturnal period (of 22:00 to 08:00 hours) was of 68,5 dBA, in Thursday, Friday and Saturdays.

Some of the measures are indicated to adopt in the ZAS, once is approved:

- *Maximum of 90 dBA of emission in all premises with musical license*
- *Prohibition of emission of music to the outside*
- *Restriction of schedules of permanence in "terraces".*
- *No concession of licenses for new establishments of bars, with or without musical license (only in the ZAS).*
- *No modification of licenses for the existing establishments at the present time (only in the ZAS).*
- *No concession of licenses for new establishments of bars with musical license (only in the Zone of respect).*
- *Absence of activities of sweepings collection and municipal cleaning, in its different variants, between 00:00 and 08:00 hours.*
- *Prohibition of glass spill to the corresponding containers during he himself period.*
- *Prohibition of sale and drink consumption through windows or similar hollows of facade.*

- *Prohibition of drink consumption in the street, safe in the “terraces”, and the noticeable schedule.*
- *Positioning of posters in different points of the limits of the ZAS of the existence from the same one.*

ACTIONS IN THE SHORT TERM.

We indicated next the already predicted performances in the short term:

Automatic control of acoustic limiters by modem.

It will be continued with the application of the system “SIGLO” before mentioned, with its possible extension to the rest of establishments of the city with equipment of musical reproduction.

Development of the ZAS.

At the moment of writing of the present communication, the definitive approval of the implantation of the ZAS is to the delay of the period of public information. It is possible to hope that in few months it is begun to apply the measures anticipated in his approval for the improvement of the acoustic situation of this zone of the city.

Continuation with the development of the application of the Municipal Law.

Important aspects of the mentioned Decree will be put in practice, such as: exigency for new city-planning of predictive study, certification for constructions of characterization of insulations.

Characterization of insulations and transmission of noise and vibrations.

It is essential the continuity in this service, that it tries to technically guarantee the fulfillment of the effective norm, and, like consequence, good levels of acoustic comfort.

Strategic maps of noise.

The City council of Leon already has anticipated the preparation of the Strategic map of Noise of the city, going ahead in the time to the exigencies derived from the Law of the Noise. This Laboratory of Acoustics already has begun the corresponding works.

CONCLUSION

During last the ten years they have been carried out in the city of Leon, performances that have contributed of substantial form to improve the acoustic atmosphere of the city, and, with it the quality of life of its citizens. Performances to which to unite the predicted ones in the short term, with airs of total continuity in the integral fight against the noise.

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