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NOISE CONTROL FOR A BETTER ENVIRONMENT

**MUNICIPAL STRATEGY FOR NOISE REDUCTION IN NIGHTLIFE  
ESTABLISHMENTS - CASE STUDY LISBON**

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**ABSTRACT**

**Decree-Law No. 10/2015, as introduced a number of changes, among which the liberalization of opening/closing hours of commercial activities.**

**The increasing number of commercial premises, with the dynamism of “Cais do Sodré” and “Bairro Alto”, has increased the tourism in that area, becoming the most attractive poles for night tourism.**

**In the last 4 years, the Municipality of Lisbon, has received about 1200 complaints about noise pollution from late night entertainment.**

**To reduce these complaints, the municipality has created instruments such as revision of the regulation of operating hours of commercial activities, which establishes the maximum working hours of each commercial activity, reducing the daily operation of some areas of the city and creating by the riverside an operating zone with unlimited schedule.**

**Specific operating rules have been created for commercial activities that operate after 11:00pm and have live or amplified music, which must meet a series of requirements, such as: soundproofing; installation of a sound limiter linked to an online platform; Accomplishment of an acoustic assessment.**

**By the end of 2018, 220 limiters have been installed, which have led to a decrease in noise complaints.**

**There is a daily monitoring by the municipal police and the municipality technical services.**

**Keywords:** Noise, late night activities, annoyance, housing, commercial activities, sound limiter, online platform

**I-INCE Classification of Subject Number:** 10

## **1. Introduction**

At European level, noise pollution is considered to be the second major environmental problem affecting health, shortly after air pollution. The sound pressure within urban areas is large and diversified and in areas with high tourist growth it is necessary to be attentive to the planning of festive events, mainly in the open air so as not to cause harmful effects on the resident population.

## **2. Lisbon, the city that never sleeps**

Decree-Law no. 10/2015 of 16 January introduced a number of amendments, among which the liberalization of opening hours of bars, pubs, restaurants and other commercial premises.

With regard to the city of Lisbon, the liberalization of working hours has led to the aggravation of a number of discomfort situations. It was therefore important to approve a revision of the regulation that limits the periods of operation of commercial activities, that allows the commercial use to be compatible with the other urban uses existing in the Municipal Master Plan, namely housing.

Reflecting this situation, it is the discomfort felt by the population in relation to the noise caused by the operation of commercial services, due to the music, with loud audible sound outside, as well as in the dwellings surrounding them.

Likewise, there has been an increase in the number of nightlife activities, which has led to an agglomeration of consumers in the outside areas, which causes excessive noise due to their movement and permanence on the streets.

This discomfort causes the residents' rest to be affected, and excessive noise and inherent rest difficulties are associated with a number of pathologies, such as psychological disturbances, lack of memory, lack mental concentration and learning difficulties. Thus, exposure to noise sources and the impossibility of resting on the basis of noise can significantly degrade personal and family quality of life and generate serious personal injury.

Likewise, this agglomeration on the streets enhances the existence of situations of insecurity, compromising the residential aspect of the areas where the commercial activities are located.

Thus, for reasons of safety and protection of the quality of life of citizens, it was necessary to limit, in certain cases, the opening / closing hours of certain activities.

At the same time, it is envisaged that specific schedules may be extended for specific events.

## **3. Portuguese Noise Regulation- Decree Law no. 9/2007 of January 17**

The Portuguese Standard NP ISO 1996 (constituted in two parts) of 2011 entitled "Acoustics, Description, Measurement and Evaluation of Environmental Noise", harmonized with the International Standard ISO 1996 "Acoustics, Description and measurement of environmental noise" establishes the procedures to be followed for acoustic tests to assess exposure to external ambient noise levels and to assess noise discomfort.

The national legislation on noise (Decree Law no. 9/2007) defines permanent noisy activity: as the activity developed on a permanent basis, that produces harmful

noise for those who inhabit or remain in places where make you feel the effects of this source of noise, namely industrial facilities or commercial and service premises.

This type of activities must fulfill two types of assumptions: the exposure limit values for sensible or mixed zone and the discomfort criterion.

The discomfort criterion is considered as the difference between the  $LA_{eq}$  indicator value of the ambient noise determined during the occurrence of the particular noise of the activity or activities being evaluated and the value of the  $LA_{eq}$  indicator of the residual noise. A difference that may not exceed 5 dB (A) in the daytime period, 4 dB (A) during the evening period and 3 dB (A) during the night.

This sound value may be increased according to the value of the percentage ratio between the cumulative duration of a sound source occurrence and the total duration of the source's operating period (day, evening or night).

Despite the existence of this legislation, municipal services have been technically unable to act independently and to trigger the usual precautionary measures to restore legality, due to the methodological impossibility of acoustic measurements that can individualize the contributions of several bars that are running simultaneously, contiguously and at the same time.

The Municipality tried to find a compromise solution and a balanced action that allowed conciliating the nocturnal animation with the right to the rest of the residents and regulars.

Among the several regulated measures such as: soundproofing, installation of a sound limiter linked to an online platform, accomplishment of an acoustic assessment.

One of the most relevant was the requirement of installing sound limiters with registration in establishments with live or amplified music, starting at 11 pm.

Besides this rules, the regulation defines 2 types of zones:

- Zone A - that as reduced daily operating time;
- Zone B - by the riverside with unlimited schedule.

#### **4. Sound Limiter's**

A sound limiter is a programmed and calibrated device to operate on sound and / or audiovisual reproduction / amplification systems, in order to ensure that sound levels do not exceed a certain pre-set threshold. In addition to limiting sound, the equipment registers and sends to an online platform the noise levels in the establishment as well as possible incidents inherent to the manipulation of the system.

The sound level limiter measures, records and controls the sound pressure level in the establishment where it is installed. The equipment inserted into the reproduction chain, between the mixing desk and the crossover, intervening in the entire sound chain.

The sound limiter must be approved by the Municipality prior to its acquisition and must comply with the following technical requirements:

- a) To act by the sound level, in order to control the pre-established levels;
- b) To have an external microphone for collecting the sound level values;
- c) Archive and save a history that shows the year, the month, the day and the hour in which the last schedules were made;

d) Have a verification system that allows detecting possible attempts of manipulation of the music equipment or the limiting equipment;

e) Have a system of sealing the connections and the microphone;

f) Detect other sources that may function in parallel with the equipment or equipment that is being targeted, as well as detect possible attempts to 'muffle' the microphone;

g) Allow the storage of episodes of manipulation attempts occurring with a programmable periodicity of not less than 5 minutes, up to a limit of not less than one month;

h) To have a system that prevents musical and / or audiovisual reproduction, in case the limiting equipment is inadvertently or voluntarily disconnected from the power supply and / or the control microphone is switched off;

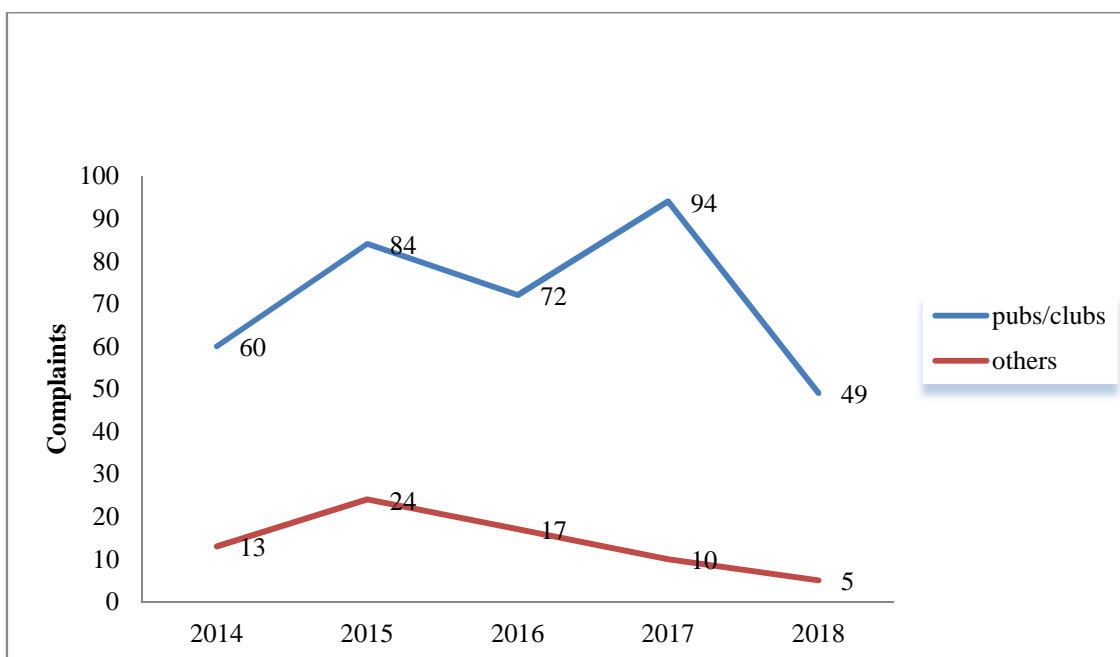
i) Automatically send the stored data, allowing remote monitoring of the time and sound levels, in real time, using a platform with access and control by the Municipality;

j) Access to parameter programming must be restricted to authorized municipal technicians, using mechanical or electronic protection systems;

k) Allow scheduling of limitation levels for different sound emission schedules, in order to ensure compliance with the schedules authorized by the Municipality, and for different days of the week with different start and end times, as well as introduce exception timetables for certain events.

## 5. Last years

In the period from 2014 to 2018, about 1200 complaints about noise pollution were received at the Lisbon City Hall, 428 of which were directly related to the emission of music (figure 1).



*Figure 1 - History of noise from commercial activities with music*

The decrease after 2017 is directly related to the revision of the regulation of operating hours of commercial activities in October 2016, which defines the categories of each type of activity, as well as the time allowed for its operation.

For the purposes of setting their operating periods, establishments are classified as follows:

Group I: restaurants, breweries, snack bars, typical wineries, take-away, cafes, taverns and other non-show drinking establishments, tea houses, pastry shops and similar establishments.

Group II: Drinking establishments as bars, pubs and similar.

Group III: nightclubs, cabarets, boîtes, dancings; “casas de fado” officially recognized by the city council of Lisbon; showrooms, theaters and cinemas; casinos and bingo halls.

Group IV: hotels and similar, nursing homes, pharmacies, medical and nursing centers, funeral agencies, fuel stations, automated banking services equipment, establishments food and non-alcoholic beverages by automatic machines, self-service laundries and establishments located in stations and terminals for land, air or sea transport.

Group V: convenience stores, and for the purposes of this Regulation, convenience stores mean those establishments in Group VI that sell alcoholic beverages, regardless of their main activity, and do not group I, duly legalized.

Group VI: establishments that do not fall into any of the groups provided for in the preceding groups.

The operating hours of the establishments installed in Zone A, taking into account the group they belong to, are freely set by the respective operating entities within the following limits:

**Table 1 – Limits of operating hours**

<b>Group</b>	<b>Operating hours</b>
<b>I</b>	Between 6am and 2am the next day, every day of the week.
<b>II</b>	Between 12pm and 2am from Sunday to Thursday, and between 12pm and 3am on Fridays, on Saturdays and on the eve of a public holiday.
<b>III</b>	Between 12pm and 4am the next day, every day of the week.
<b>IV</b>	Between 12am and 12pm the next day, every day of the week.
<b>V</b>	Between 6am and 10 pm, every day of the week.
<b>VI</b>	Between 6am and 12 am, every day of the week.

For the purposes of this Regulation, the timetable for esplanades shall be similar to the time of their establishment.

To minimize complaints, specific operating rules were defined for each type of activity, including the requirement that after 11 pm a sound limiter with registration, linked to an online platform, where possible for the municipality, monitor, reduce the

time of music emission, as well as change the sound emission limits of commercial activities.

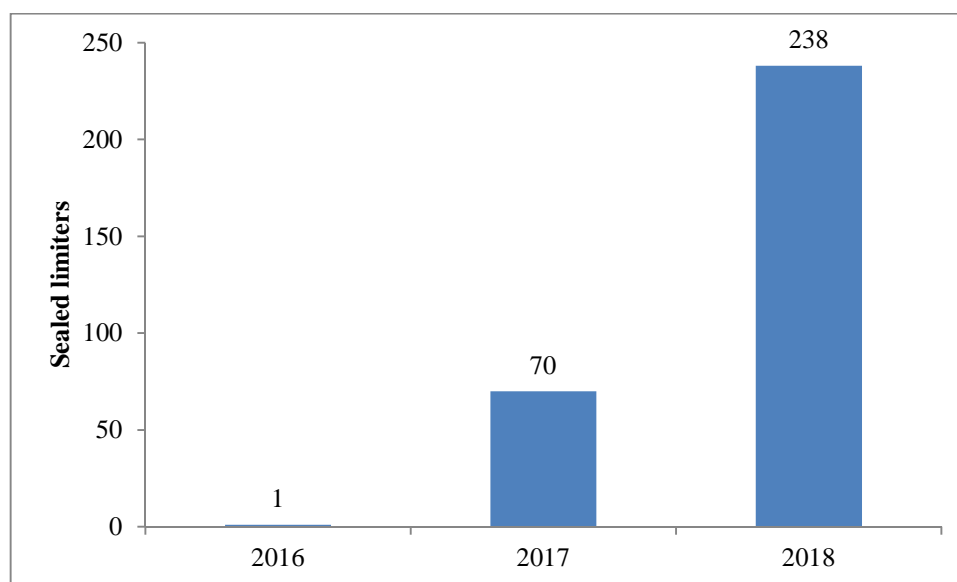
Bars, pubs and restaurants are also obliged to operate with closed doors and windows after 11 pm.

In order to benefit the activities that are not located near residential areas, has been created a “B zone”, next to the Tagus River, where the activities do not have closing times, however, they have to fulfill the same requirements as the activities in located near residential areas.

A legal deadline of 120 days was given for the adaptation to the new regulation of schedules, which ended on March 9, 2017.

Within the period granted, a number of awareness-raising actions were carried out with night-time activities, with some municipal authorities, as well as police authorities, in order to provide a new knowledge of the new regulation.

Concerning the installation of sound limiters, 238 commercial activities were verified and sealed by the Lisbon City Council from October 2016 to December 2018, as can be seen in the following figure:



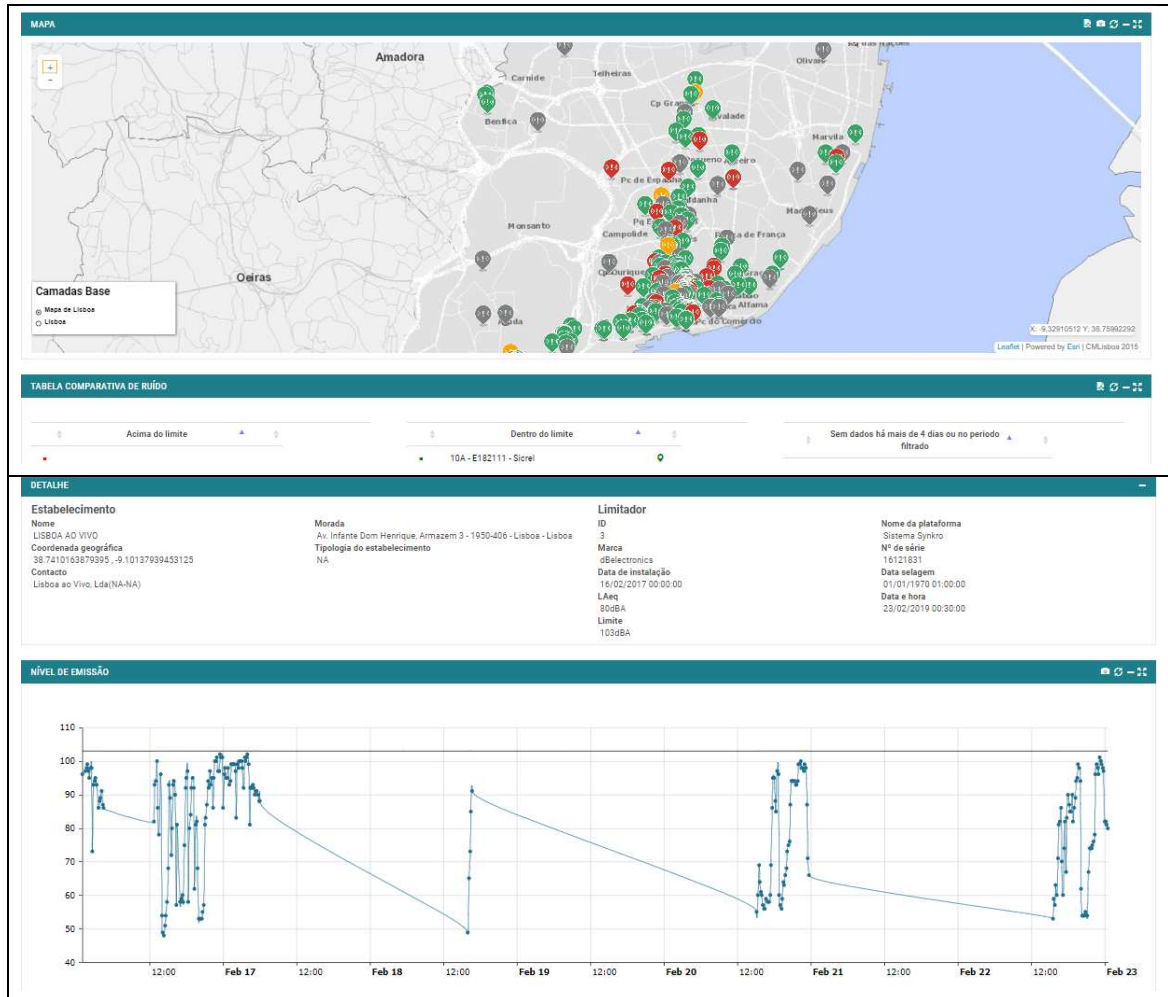
*Figure 2 - Sealed limiters through the last 3 years*

The relationship between the number of sealed limiters and the decrease in the number of complaints are directly linked, leading to a better environmental noise in the city of Lisbon.

## **6. Platform of Intelligent Management of the City of Lisbon**

The Platform of Intelligent Management of the City of Lisbon, is a tool that constitutes the technological support of the Integrated Operational Center (COI) and allows the municipality of Lisbon to provide innovative tools for collaborative management of events and events between Civil Protection, Fire Brigade, Municipal Police and operating services of the city council, also integrating the Police Authorities and information of the various infrastructure operators of the city.

The Platform of Intelligent Management of the City of Lisbon developed a dashboard, where it is possible to aggregate all brands of manufacturers of sound limiters, facilitating the monitoring of activities in real time and the occurrence of illegalities related to the operation of limiters (manipulation, disconnection, muffling of the microphone and sound limit above the established limit)



*Figure 3 - Online monitoring platform for sound limiters*

The Lisbon Municipal Police, which after the implementation of the regulation played an important role in supervising the new regulation of schedules, carried out around 9230 inspections of establishments, of which 498 were made due to non-compliance with the timetable and 237 for unlimited music and / or operation with doors and windows open to the outside.

These inspections resulted in 225 temporary restrictions and 49 definitive restrictions.

## 7. Conclusion

The work carried out in recent years by the municipal services has reduced the number of complaints about noise produced by music emission from permanent

activities, allowing a real-time monitoring of the noise produced by the activities, whether permanent or temporary.

This evolution in the response of the municipal services reflects an improvement of the information service to the citizen, as well as of the monitoring, which allows to improve the quality of life of the citizens of the city of Lisbon.

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