PRELIMINARY RESULTS OF NOISE MONITORING FROM ENTERTAINMENT HALLS IN ALGERIA

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1 ABSTRACT

These last ten years, in Algeria noise pollution has become an environmental issue where people are exposed to unacceptable levels of noise. The main noise source is from traffic, from neighbourhood and domestic noise particularly (entertainment premises known as wedding halls). Other significant sources of noise annoyance in Algeria include building construction and household noise as well as car alarms and even barking dogs. In this present study, my concern will be on one of the main noise source in Algeria which is noise from entertainment halls.
Unfortunately in Algeria, there is no existing framework or enforceable code for noise control. In view of the absence of a proper noise control standard in Algeria, a large number of wedding halls have been built without any protection (insulation, double glazing...) causing disturbance and annoyance in the neighbourhood. The noise from these wedding halls is badly affecting neighbours. Modern amplification and music styles make this an increasing problem. Therefore local people saw their lives disturbed by the noise caused by these kinds of recreational halls.
As a result of the lack of standards, this study was conducted. A noise survey has never been previously attempted in Algeria.
The aim of this survey is to establish noise level limits and measurements according to the WHO guidelines recommended to create the necessary set off regulations and guidelines on which we could rely in treating the different noise problems in Algeria.

2 INTRODUCTION

Algeria, a gateway between Europe and Africa, is located in Northern Africa. The Sahara desert covers over 80% of the country's territory. The population of Algeria is over 30 million – most of the population lives in the northern part of the country. The capital city Algiers (including the suburbs) has the population of around 3.5 million. In the last forty years, rapid population increase in Algeria (the population has grown from 10 million to over 35 million) has resulted in a high demand for housing construction[1].
At that time Algeria's need was new buildings for the fast growing population. One of the main demands was to build houses with a good functionality but there was no consideration whatsoever of the climate of the site.
There was also a lack of comprehensive planning, and urban design, as a result, more than 67% of the construction in the most affected cities in the last earthquake which has occurred Algiers and Boumerdes was undertaken in the last 30 years.
In general, the construction has been mostly done by private contractors, often without the required professional qualifications without any concern for to thermal or acoustic performance. The prevalent type of private single-family construction includes one to three-storey high concrete frame buildings (see Fig.1).

Most of the buildings are left without any external finishes and poorly insulated or no thermal or acoustic insulation, this was due to shortage in owners' budget and to decrease the cost of the building. In some urban municipalities, a large proportion of the private construction is illegal (without building permits).

Figure 1. Typical single-family housing construction.

Source: Ministry of Housing and Construction

The aim of this study is to draw guidelines and construction techniques for Algeria and to develop construction materials locally available to reduce noise breakout

3 NOISE CONTROL STANDARDS IN ALGERIA

As mentioned earlier, in Algeria noise control standards are almost absent. However, a decree exists within the local authorities since 27 July 1992. This decree is mainly based on the French norms. This decree outlines the legal measures. It defines the limits for noise exposure where the maximum sound intensity levels accepted in the close vicinity of hospitals or schools premises and in rest areas or relaxing areas as well as in their enclosed spaces are of 45 decibels (45 dBA) in diurnal periods (6am to10pm) and 40 decibels (40 dBA) at night (10 pm to 6 am)[2].
In the decree, guidelines are described on how constructions for housing purpose or for professional use should be conceived and realised taking into account the acoustics quality of the walls and floors.

4 NOISE MONITORING IN ALGERIA

A noise survey has been conducted in the city of Algiers, during the hot season where most of the weddings are held. The survey was divided into two types:
Subjective survey, involved collecting data from the subjects through questionnaire.
Objective survey, which involved measuring the noise levels where the subjects have been questioned.
A number of twenty wedding halls have been monitored using a sophisticated instrumentation.
An initial survey has been held in winter by mean of questionnaires. Two types of subjects have been selected for the survey as follow:

- Subjects representing people bothered by the noise from entertainment premises
- Subjects representing landlords or owners of the entertainment halls

A total number of twenty five subjects has been interviewed and asked to fill a questionnaire.
All subjects were mostly annoyed by almost all sort of noise source, especially noise from traffic and noise from neighbours (music, dog barking…) this represents 90% of the subject's votes. Also the subjects feel that the noise from entertainment halls is more disturbing than traffic noise especially when weddings are celebrated during night-time.
Asked how often they are annoyed by the noise from wedding halls, the subjects reply varies from daily to once in a week to once in fortnight. This was due to the period of the year where most weddings are celebrated in summer on a daily basis. The subjects were also asked whether they have ever complained to local authorities about the noise from entertainment halls. The answer was never because the subjects do not know the complain procedure and have no idea where to complain and most of the time they fear reprisal from wedding halls owners. Another reason is that the subjects believe that the local authorities would not solve the problem because there is no regulation.

From the landlords answers, we observed that they are confident that the neighbours would not complain and that the local authorities would not penalise them. When asked whether there are action to avoid disturbing the neighbours the landlords replied that they have installed air conditioning this will avoid opening the windows during the summer and it keeps the noise from music in side the premises.

4.1 Instrumentation

Noise measurements have been undertaken using the software package **dBTRAIT32** (see Fig 2) which has been developed for the treatment of environmental noise measurement data[3].

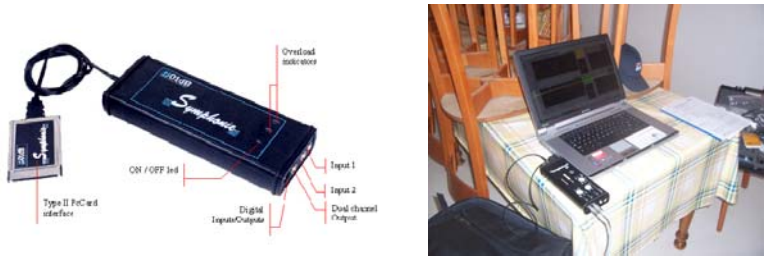


Figure 2: measurements equipment used for noise monitoring

Monitoring has been held in some premises when there was no wedding (music off) and when the wedding was on. Two weighting scales have been used (A) and (C) using two different microphones. Both microphones were calibrated before and after each measurement. The microphones were located at 1 metre from the neighbours' window attached to a pole.
The monitoring was conducted over the whole period of the weddings with the microphones located in the neighbours affected by the noise and inside the venue sometimes. During the monitoring, Leq, Lmax, Lmin, L90 were measured for both channels

5. RESULTS AND ANALYSIS

Table1

Venue	Time of day	Microphones location	Weighting	LA max	Leq	L90	Activity
1	Day	1 m outside opposite neighbour window	A	86.9	68	58.1	music off
			C	89.9	70	62.4	music off
1	Day	1m outside opposite neighbour window	A	99.6	72	57.2	music on
			C	99.9	72	61.2	music on
2	Night	1m outside a flat above the venue window	A	84.8	67	57	music off
			C	90.6	73.9	61.4	music off
2	Night	1m outside a flat above the venue window	A	101.7	77	66.5	music on
			C	104.9	82	71.6	music on
3	Day	1m outside neighbour window adjacent to the venue	A	80.2	42	37.7	music off
			C	92.1	51	37.3	music off
3	Day	1m outside neighbour window adjacent to the venue	A	100.3	72	56.4	music on
			C	112.3	75	64.8	music on

4	Day	1m in balcony ,2 floors above the venue	A	90.3	64.2	57.2	music off
			C	89.9	76	66	music off
4	Day	1m in balcony ,2 floors above the venue	A	97.5	72	64.1	music on
			C	98	83	73.8	music on
5	Day	1m from window above the venue	A	92.1	72.2	63.9	music off
			C	96.7	79.1	70.8	music off
5	Day	1m from window above the venue	A	106.9	86	72.6	music on
			C	107.8	91	77	music on
6	Day	1m from window opposite the venue (outside)	A	93.1	67.5	53.1	music off
		opposite the venue around 7 metres (inside)	A	84.1	54.1	39.1	Music off
6	Day	1m from window opposite the venue (outside)	A	98.9	78	67.9	music on
		opposite the venue around 7 metres (inside)	A	86.3	57	54.8	music on
7	Day	1m from window above the venue	A	96.1	67	63.7	music off
			C	98	76	63.2	music off
7	Day	1m from window above the venue	A	96.1	78	67.9	music on
			C	98	86	81.4	music on
8	Day	1m from window above the venue	A	77.4	53	48.6	music off
			C	100.6	70	57.4	music off
8	Night	1m from window above the venue	A	106.1	76	56.2	music on
			C	114.2	81	62.8	music on
9	Day	1m inside the venue but in the above floor (bride changing room)	A	88.9	70.1	62.2	music off
			C	93.1	72.4	65.9	music off
9	Day	1m inside the venue but in the above floor (bride changing room)	A	101.8	87	63.8	music on
			C	105.8	92	67.3	music on
10	Day	1m outside opposite the venue	A	97.3	69	58	music off
			C	103.6	84.1	70.1	music off
10	Day	1m outside opposite the venue	A	97.3	77	58.6	music on
			C	104.4	81	78.4	music on

Table 1 describes the Leq, Lmax and L90 recorded during the monitoring using both weighting A and C as well as the location of the microphones and the activity inside the venue when the wedding is on and off. It can be clearly seen that the ambient noise level is higher when the wedding is on.

A sample analysis is presented showing noise monitoring at two venues, one in day-time and the other one in night–time

5.1 Case study 1 (day monitoring)

Figure 3: sound level record of Venue 3 (wedding on)

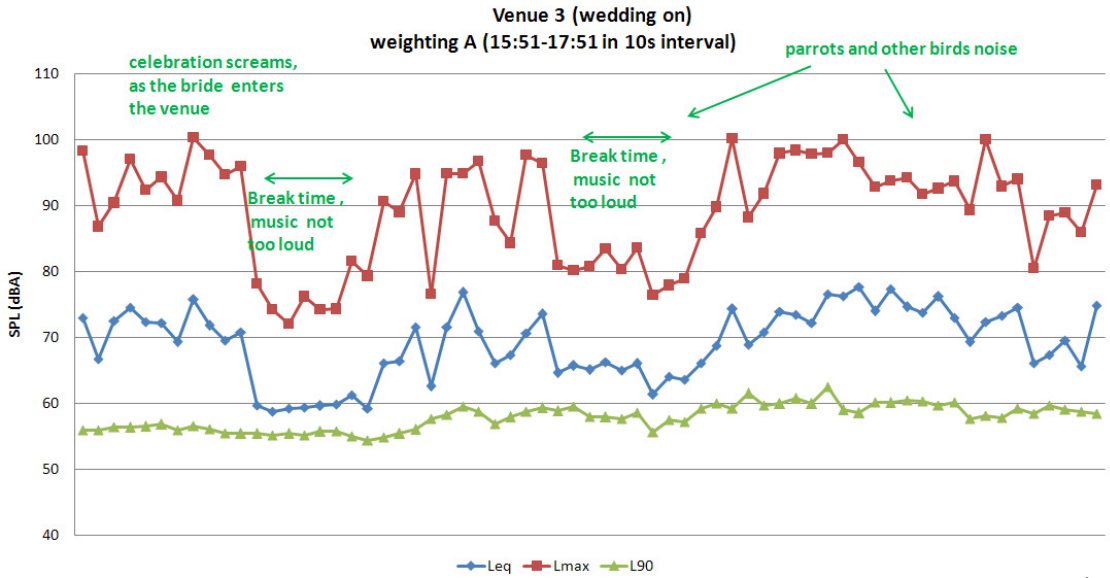
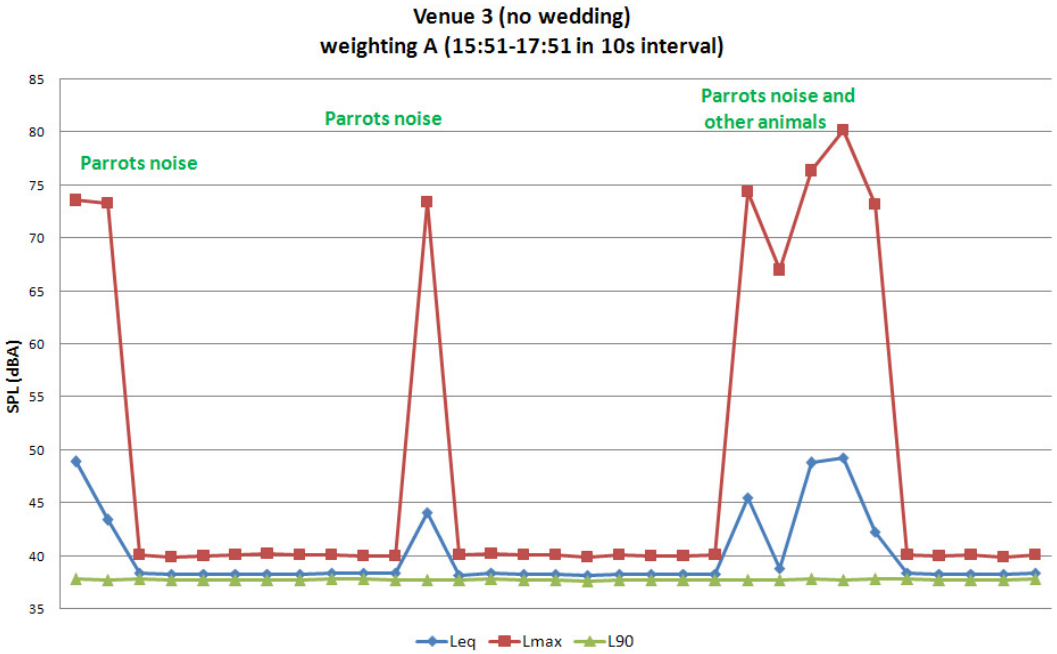


Figure 3 shows that the LAmax reached 100.3 dB which is more than the recommended WHO[4] guidelines for the LAmax by exceeding it by more than 30 dB.
The average LAeq recorded for the whole period is around 71.6dB. The background level (L90) registered an average of 56.4 dB.
Noise vents were also recorded during the wedding period; it includes celebrations screams and most importantly noise from a parrot and other birds which sounded very high ranging from 98 and 100 dB. During the wedding, short breaks were noted lasting around fifteen minutes, however the music was kept on but the volume was reduced.

Figure 4: sound level record of Venue 3 (wedding off)

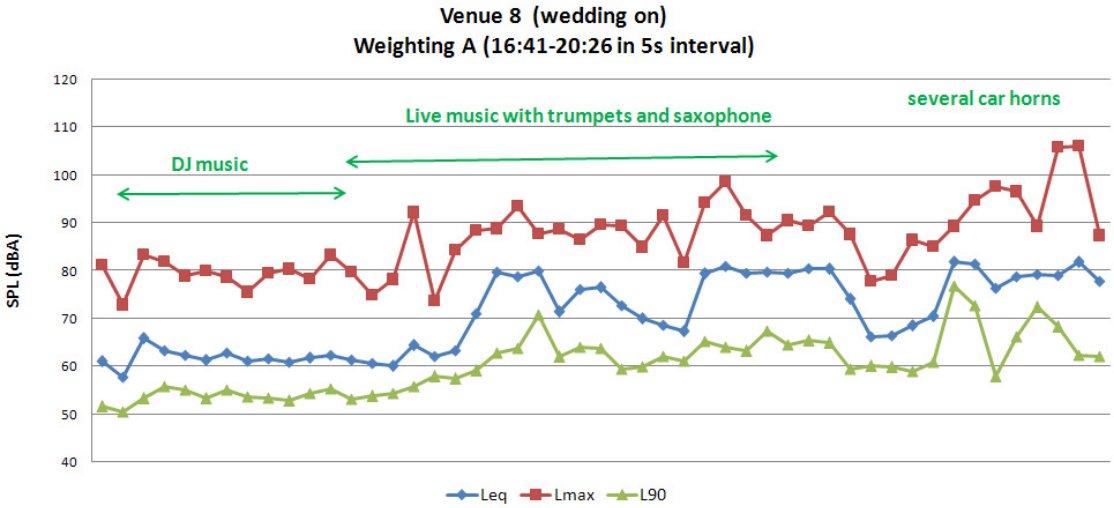


The noise monitoring was recorded when there was no wedding and the venue empty, the same equipment was used and the microphones were installed in the same position as mentioned earlier.

Figure 4 shows that an average LAeq of 42.1 dB and an LAmax of 80.2 dB was recorded. The LA90 indicated 37.7 dB which is much lower than the LA90 recorded when the wedding was on. The only noise incident recorded was mainly from a parrot and other birds which is clearly indicated in the graph, it ranged from 68 to 80 dB.

5.2 Case study 2 (night monitoring)

Figure 5: sound level record of venue 8 (wedding on)



The monitoring started around 6:30 in the afternoon and lasted just after 22:30. The music from the venue was audible from the street as the wedding was celebrated in the upper level of the venue. Figure 5 indicates that the LAeq averaged around 76.1dBA. The background level LA90 varied between 50 and 75 dB.

During the wedding period, it different music rhythms were noted especially when there was live music and patrons clapping and chanting and some instrumental music.

Figure 6: sound level record of venue 8(wedding off)

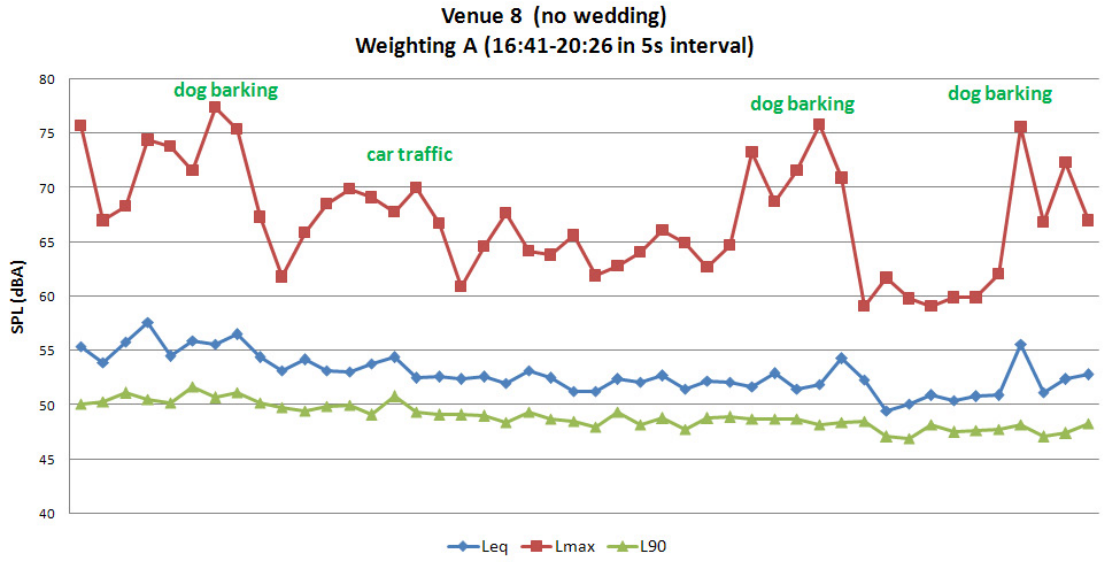


Figure 6 shows that the average LAeq recorded was around 53.3dB. The highest noise level registered was LAmax 77.4 dB. This due to the high level of noise events observed during the

monitoring. It has been noted , a presence of a dog in the terrace which was barking frequently , this explains the peaks in LAmax shown in the graph and table. The LA90 indicated 48.6 and dB.

Table 2

	LAeq(music on)-LAeq (music off) dBA	LAeq(music on)-L90 (music off) dBA
venue 1	4	13.9
venue 2	10	20
venue 3	30	34.3
venue 4	7.8	14.8
venue 5	13.8	22.1
venue 6	2.9	17.9
venue 6	10.5	24.9
venue 7	11	14.3
venue 8	23	27.4
venue 9	16.9	21.1
venue 10	12	19

Table 2 describes the difference between the LAeq when the wedding is on and off as well as the difference between the LAeq wedding on and the background noise (L90) when the wedding is off. We can clearly see that the difference varies from venue to another and the noise level differences are significantly higher than the standard limits.
The reason that there is so much variation is due to a number of reasons mainly associated with the level of background and by how much either the background or in particular how much the ambient (LAeq) is affected by additional high energy noise or how sporadic the music activity is.
To sum up, the difference in Ratings is greater:
a) when the ambient (LAeq) is affected by high energy noise from other sources or
b) when the background is elevated by other noise sources.

6 DISCUSSION

Entertainment in discotheques and wedding halls have become an important part of community life, of course these premises also bring in business for the licensees and also boost the local economy .However it is obvious that the musical entertainment also leads to noise nuisance affecting local residents. During my investigations in Algiers concerning this subject I have understood that all the entertainment premises I have visited in the centre of the capital and its suburbs have been working without applying any true ,clear regulations concerning noise in general . I have found out that unfortunately (for these premises neighbourhood) no serious standards or codes of practice have been written in Algeria for the purpose of giving guidance or an objective assessment methodology to assist officers investigating neighbour and neighbourhood noise when they happen to deal with noise complaints.
Up to now the only body noise complainers could refer to solve their noise problem is the police who most of the time resolve to make the antagonists meet, to cut the matter short they usually order them to reach a mutual compromise and resolve the problem amicably. In fact, most of the wedding halls which have sprung up everywhere and everyday between 2000 and 2007 have opened up in centre of towns close to places of residence entailing extreme noise nuisance to the neighbourhood. The people affected by noise disturbance do not know who can settle their complaints, except of course, a legal action which of course involves a loss of time and money.
Being more and more aware of the health impacts of community noise and the harmful effects of noise in non industrial environments, several associations have involved themselves in order to attract the attention of the Algeria Authorities on the health risks to humans from exposure to environmental noise. They have addressed several warnings on the issue of noise control and

health protection. One way to stop noise nuisance would be to enact regulation, guidance or equipment to use to measure noise levels and decide which level can be considered as a nuisance depending on the local circumstances. The choice of the criteria will depend on the time of day. Although Algeria does not have a significant 'Siesta' culture, noise during the afternoon is perceived as a problem. But not as much as in the late evening (after 10pm). The measurements show a considerable increase in the noise level when the 'weddings' are on. This would not prove acceptable in the UK. Arguments will need to be advanced as to the correct criteria to be used in the specific circumstances of Algeria and how they can be achieved using local materials and construction practices.

The only organisation dealing with noise measurement and whose main role is to provide the entertainment premises with the required certificate entitling their opening up. There is very limited official documentation and publication relating to the noise who decide to issue these certificates and in addition an absence of the appropriate equipment to measure the noise levels, or source of the noise (construction materials, exposure of openings. .etc..)Which can help to give an assessment of their effects on the surrounding community and control noise nuisance.

Many people living in the neighbourhood of wedding halls were questioned and have no possibility to get a proper assessment of the noise nuisance when they complain about which can help them gather and determine evidence of the noise disturbance and therefore assist them to give sufficient evidence to establish statutory nuisance in court.

7 CONCLUSION

Noise pollution must be seriously and rapidly tackled by the Algerian Authorities. Architects, town planners, property developers, building constructors, preventive or repressive regulation conceptors ,town hall officers have a role working hand in hand to define at the source, the most adequate means-materials equipments, regulations-necessary to provide the most efficient acoustical isolation taking cost into consideration. It is therefore the role of building professional to conciliate the population necessary comfort without noise problem with the economic preoccupation of the constructors and entertainment building owners.

My task when I go back to my country is to intervene with the results of my research to struggle against noise pollution in the most efficient way. As an architect, all my efforts have focussed on all the construction aspects, the analysis of their technical aspects so as to perform the best insulation in defining the best insulation, the human being perception of noise and some theoretical notions of our auditory organs our needed without forgetting the principles of transmission of noise necessary of the choice of the most adequate building materials aiming to limit noise transmission. The most efficient way is to initially foresee the noise risks of the buildings exposure with regard to the neighbouring environments

8 REFERENCES

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3. http://www.dbkes.com.tr/brosur/symphonie.pdf.
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