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GUIDELINES FOR AN INSTITUTIONAL PROPOSAL FOR THE CREATION OF A NOISE AND VIBRATION OBSERVATORY IN URUGUAY

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ABSTRACT

Concern about noise pollution and the consequences of exposure to noise and vibration is of worldwide relevance. Organizations such as the World Health Organization have dedicated spaces to visualize these problems of exposure to noise and vibration. So much so that they describe noise pollution as the first environmental nuisance in developed countries and as a threat to public health. In Europe, noise pollution is the second most harmful environmental factor. There are multiple studies where it is demonstrated the link of diseases with exposure to noise and vibration, such as heart disease, emotional pathologies, digestive disorders, among others.

Keywords: *Observatory, Noise, Vibrations*

1. INTRODUCTION

What is a Noise and Vibration Observatory?
The Noise and Vibration Observatory operates as a tool that, from the processing of environmental information on noise and vibration, generates knowledge and guidelines for action so that, jointly, the population and the authorities become aware and act to mitigate the effects on the welfare and public health of exposure to noise pollution caused by noise and vibration. It will supervise, together with the Government and the University, the operation of an equipment calibration laboratory.

The information processed will be used to develop communications of interest to the population as well as to support actions in defense of citizens and to seek changes in legislation to improve their welfare and health conditions.

2. GENERAL OBJECTIVE OF THE NOISE AND VIBRATION OBSERVATORY

To manage the environmental information on Noise and Vibrations, making it available for actions for the benefit of the population.
This Observatory is aimed to carry out actions such as:
- Working together with the Institutions that already carry out some of the tasks related to environmental noise pollution, for the collection of information on Noise and Vibrations. The compilation will include records of measurements, reports related to the subject, description of actions developed from detected problems related to noise and vibrations, etc.
- The development of local information through the promotion of inter-institutional and intra-institutional research related to the consequences of noise and vibration exposure. Developing local databases with historical and new information obtained. Processing information with inter-institutional data cross-checking.
- The analysis of current regulations, proceeding to their assessment, the follow-up of policies related to noise and vibration, and their evaluation with respect to international regulations and environmental agreements entered into by Uruguay. Reviewing the regulations, particularly those related to construction (buildings, traffic routes) regarding

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noise and vibration. Updating the regulations in response to environmental commitments acquired. Proposing adjustments for its updating and seeking consensus to unify noise and vibration regulations in the country.
- Registering and analyzing the social problems associated with noise and vibrations (Noise Pollution).
- Proposing a noise and vibration monitoring network with fixed and mobile stations. Registering and processing data. Elaboration of reports. Generation of proposals for noise attenuation solutions. Elaboration of the "MAP OF NOISE AND VIBRATION ALERTS". Analyzing the information to be made public on noise and vibration. Maintaining public information channels and managing their operation. Evaluating the realization of mass participatory mapping for noise and vibration. Maintenance of technical and information processing equipment. Maintenance of an operational Noise and Vibration Control Center where the Noise and Vibration Alerts Map is displayed centrally in addition to being able to visualize specific selected points. Developing noise and vibration simulation models.
- Giving general guidelines for the installation in the country of a certification laboratory for noise and vibration measurement equipment. This laboratory will depend on public institutions with competences for this task.
- Supporting the actions of the municipalities in their competence as environmental police. Reviewing specific regulations and evaluation of problems. Generating actions and designing a system, with specific equipment and resources, for the automatic control of deviations from the regulations and subsequent derivation of the information to the offices with competence to apply sanctions.
- Analyzing specific noise pollution problems and proposing possible solutions.
- Systematizing information related to noise and vibration from the register of complaints. Statistical treatment of information.
- Promoting the relationship with other organisms related to noise and vibration problems. Facilitating the generation of agreements for the exchange of information and homogenization of information to be made public.
- Promote the formation of a National Noise and Vibration Honorary Advisory Council (CCOHNARVI) that will function as a consultative body. The National Noise and Vibration Honorary Advisory Council should have the participation of at least three national referents in noise and vibration issues and in parallel maintain communication with the main actors linked to the subject such as the Ministry of Environment, the Congress of Mayors, the UDELAR (Faculty of Engineering, Faculty of Architecture, Faculty of Social Sciences, Faculty of Information and Communication, etc.), the Neighborhood Ombudsman, Social and Business Organizations.
- To carry out the management for the realization of training and communication instances such as Congresses, Forums, Informative Talks, etc. to spread and raise awareness about the noise and vibration problems and to elaborate possible actions to mitigate the impacts of these problems.
- It will supervise, together with the National Government and the University, the operation of a calibration laboratory for equipment related to noise and vibration measurements.

3. SPECIFIC LINES OF WORK

- Centralizing information on noise and vibration.
- Managing the network of noise and vibration records.
- Processing available information and information generated from new records.
- Updating available tools (acoustic map, regulations). Definition of homogeneous noise and vibration zones. Strategic map. Support environmental police tasks. Noise and vibration laboratory.
- Raising awareness of noise and vibration problems. Periodic reporting. Preparing information for public disclosure. Developing the concept of co-responsibility.
- Evaluating the development of collaborative noise and vibration maps adjusting them with the records of fixed and mobile networks.
- Developing noise and vibration simulation models.
- Coordinating the supervision of the equipment calibration laboratory.

4. INSTITUTIONAL INTEGRATION

General aspects of the integration of the observatory in an Institution are shown:
- Dependency relationship: 2nd or 3rd institutional level.
- Unit modality with allocation of resources

4.1 MINIMUM HUMAN RESOURCES:

- 1 engineer specialized in Acoustics and Vibrations.
- 2 assistant engineers
- 1 electronics technician with knowledge in telecommunications.
- Transversal supports from institutional dependencies linked to noise and vibrations.

4.2 EQUIPMENT:

- Sound level meter network reviewing and complementing other existing networks and adapting mobile recording equipment.
- Seismograph network to be considered and vibration equipment to be acquired.
- Data transmission and reception at headquarters. Maintenance and operation of recording networks. Noise and Vibration Control Center.
- Processing software and appropriate hardware. Data backup units.
- Availability of transportation for recording, maintenance and supervision of the networks.

5. ENVIRONMENTAL POLICE

To the extent that it falls within the purview of the Institution that hosts the Observatory, support the environmental police tasks that will continue to be carried out as before. The observatory will support these offices.

6. INFORMATION TO BE COLLECTED AND ORGANIZED ON NOISE AND VIBRATIONS

- Compilation of information within public institutions: City Halls, Faculty of Sciences, Faculty of Engineering, Neighborhood Ombudsman, etc.
- Information on noise and vibration regulations: National norms and departmental norms. Compilation.
- Records of the existing sound level meter network in Uruguay.
- Compilation of data on complaints or inspections related to noise and vibration.
- Acoustic map of Montevideo. Departmental acoustic maps.
- Proposals for updating regulations. Feasibility of unification of regulations.
- Compilation of other available information
- Experiences from Uruguay
- Experiences outside Uruguay
- International regulations. Agreements and commitments.
- Equipment certification. Certification laboratory.

7. EQUIPMENT FOR NOISE AND VIBRATION RECORDING NETWORKS TO BE INSTALLED

7.1 Recording networks with sound level meters.

The Municipality of Montevideo has a network of fixed sound level meters that should be updated and maintained. Verify the existence of other networks in the country. Implement the installation of equipment to develop a recording network with sound level meters. It is proposed, based on this existing network, to acquire equipment for fixed installations and mobile noise recording to complement the existing network and meet the specific needs of the Observatory. Analyze the network, adapting it to obtain data of homogeneous quality in the fixed network compared to the mobile equipment.

7.2 Seismograph recording networks

There is a network of seismographs operated by the Faculty of Sciences. It is proposed to acquire equipment for fixed installations and mobile vibration recordings to complement the existing network and meet specific needs of the Observatory.

7.3 Recording networks oriented to monitoring.

Evaluate international experiences of recording and monitoring networks for noise, especially associated with construction and traffic. The facilities have noise recording equipment and cameras to identify noise sources.

7.4 Network complements to be installed.

- Hardware and software for network data storage and transmission.
- Implement the noise and vibration monitoring network based on the knowledge generated in the development of other data recording and transmission networks.

8. MINIMUM SOFTWARE AND HARDWARE FOR THE NOISE AND VIBRATION OBSERVATORY.

- The use of free software is suggested as far as possible.
- Mapping in the existing geographic systems of Ministries and Municipalities. Implement the warning map. Improvements to be proposed in the existing systems.

Linkage for the reception of information from mobile telephone equipment.
- Use for dissemination the existing channels already established for environmental issues in both the Ministries and the Intendancies. Improve and expand communication channels.
- Two fixed equipment and one laptop for information management.
- All the equipment will have the software installed.
- They will have features that will allow storing and processing all available information and making adequate backups.
- One of the fixed equipment will be the main equipment and will receive the information from the sound level meter and seismograph networks. The other equipment will function as a backup. All the information is backed up in the institutional servers.

9. NOISE AND VIBRATION HONORARY ADVISORY COUNCIL

- The Noise and Vibration Observatory, together with other institutions, shall promote the creation of an Honorary Advisory Council on Noise and Vibration, which shall have at least three members, who are referents in Uruguay on noise and vibration issues. It will act in consultation with the rest of the actors linked to noise and vibration issues: Ministry of Environment, Congress of Mayors, UDELAR (Faculties of Medicine, Engineering, Social Sciences, Psychology, Architecture, Information and Communication), Neighborhood Ombudsman, associations of transport companies, events (discos, parties, music, dances, ...).
- Functioning as a forum to raise and discuss general issues of social scope related to noise and vibrations.
- Resolutions of an orientation nature that may or may not be taken later at a normative level.
- Contribute to raising awareness on noise and vibration issues and the generation of strategies to address this problem with general consensus.

10. EXPERIENCES IN URUGUAY TO BE TAKEN INTO ACCOUNT BY THE NOISE AND VIBRATION OBSERVATORY

OAN: National Environmental Observatory. It depends on the Ministry of Environment. Among the environmental issues it could integrate noise and vibrations.

MOVES PROJECT: Noise studies were carried out as part of this project.
NOISE MONITORING: Municipality of Montevideo (Grafana) There is a fixed network of sound level meters that theoretically measure 24/7 but have some updating problems. There is historical information that should be evaluated.
NEIGHBORHOOD OMBUDSMAN: Compilation of complaints related to noise and vibrations.
ELECTRICAL AND MECHANICAL INSTALLATIONS SERVICE: Municipality of Montevideo. History of noise nuisance complaints. History of seismograph measurements in tasks related to construction using explosives.
FACULTY OF SCIENCES: Geophysical Observatory of Uruguay.
NATIONAL EMERGENCY SYSTEM: Record of earthquakes in Uruguay.

11. NOISE AND VIBRATION OBSERVATORY. EXPERIENCES OUTSIDE URUGUAY.

There are similar experiences in the world. In some cases, they are already implemented and in development; in other cases, only some aspects of the proposal have been implemented.
As examples we have the City Grenoble with Accoucite [1] of Paris with Bruitparif [2] , , in Cordoba (Argentina) the Noise Observatory of Cordoba [3], in Australia the Australian Observatory of Acoustics [4], Ecodes in Barcelona [5] , and experiences in some cities of Colombia [6] and in Santiago de Chile [7].

12. RELEVANT ROLE FOR DEVELOPMENT IN LATIN AMERICA

Some experiences have been reported, mainly in Europe, of noise observatories. In the case of Latin America, being able to set up a noise and vibration observatory such as the one proposed will be a milestone to support the development of those partial experiences already underway and to encourage the installation of other observatories in Latin American countries.
The possibility of having local noise and vibration measurements makes it possible to develop policies to improve the quality of life of the inhabitants of Latin America. The possibility of having own indicators for Latin America favors a more effective measurement of development projects that include improvements in noise and vibration impacts. It also makes possible, to the extent

that it is possible to maintain continuity, the existence of time series of values to weigh improvements due to implemented policies.

13. ASPECTS OF NOISE POLICY.

In the case of Uruguay, regulations originate from different agencies at the two higher levels of government. The initiative may come from these levels of government or from other agencies. There are laws, decrees, regulatory decrees that cover the whole country. There are local regulations that originate from departmental governments.
At the national level, through the Ministries of the Environment, Labor and Social Security and the Ministry of Health, there are regulations and the authority to oversee the regulations. At the departmental government level, there are regulations and the authority to oversee them.
The regulations also include the international conventions signed by Uruguay at the ILO or the WHO that are related to noise and vibration control.
A review of the existing regulations shows that in many cases they are outdated, the values are difficult to adequately control and there are differences between the requirements of the departmental governments.

14. URUGUAYAN REGULATIONS

In the case of Uruguay there are national and departmental regulations.

14.1 NATIONAL REGULATIONS

Law No. 17852. Prevention, surveillance and correction of noise pollution.
Decree N° 143/012
Noise and vibration regulations are included in the regulatory compendium on occupational health and safety. [8]

14.2 DEPARTMENTAL GOVERNMENT REGULATIONS

Each departmental government has its own regulations in addition to the national regulations they must comply with. [9] .

15. RECOMMENDATIONS.

It is advisable to set up a Noise and Vibration Observatory in Uruguay to centralize existing and new information generated from field work on noise and vibration.

This Observatory will become a national reference point on this subject, making the information available for its use with different scopes, from the elaboration of regulations to the dissemination for educational purposes.

The existence of a reference center of this type in the country will serve as a bridge to establish exchange agreements with other similar centers around the world.

16. REFERENCES

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