VALUATION OF THE ACOUSTIC ENVIRONMENT BY THE DOUBLE SKIN FAÇADE FOR POSTGRADUATE CLASSROOM OF THE NATIONAL AUTONOMOUS UNIVERSITY OF MEXICO

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ABSTRACT
The recent building for classrooms of postgraduate studies of the UNAM (2013), exceeds the international standard acoustic comfort of (35dBA), investigating it was determined that the noise entering through the façade that gives to the Insurgentes avenue does not isolate the enough noise. On the other hand, the university legislation does not allow to alter the original facades because it belongs to the cultural heritage of UNESCO-UN, to solve this problem, it was initially brainstormed, in the end two alternatives were proposed. 1° an Insulation Barrier (IB), located at the edge of the property that divide the vehicular stream and the architectural complex; 2° a Double Skin Façade (DSF), with photovoltaic glass 2 meters from the original façade, without laterals that close it. To simulate the SPL that isolates the IB, and those will have been between the original façade and the DSF, The LimA predictor program was used, the microphones values obtained in the first proposal were placed two meters from the original façade, this test was carried out in two different heights from IB, the results were that does not reduce enough, with maximum values of 5 dBA and the interior SPL is 38 dBA or greater. The second proposal, was made in two different DSF heights, the acoustics insulation values obtained by microphones that were placed onside that space are in the range of 11 to 18 dBA, based on these results the SPL inside the classroom are in the range of 28 to 35 dBA, so now it meets acoustic comfort. Analyzing the values obtained with the simulator, we can say that they are probable. Additionally, consider in the urban landscape sustainable building with DSF.

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INTRODUCTION

The National Autonomous University National of Mexico (UNAM), has the title from of being the university of the nation, is located south of Mexico City (CdMx), has a total area of 730 Hectares, that is more than what some measure cities in Europe and even what they measure some of smallest countries, such as Vatican City 44 hectares, Monaco 202 hectares. Initially successful the architectural design of the spaces and buildings of the UNAM, has hardly changed in the last 60 years; it is practically design and built just as was when he campus of the University City (CU) was created (1952). This decision was reinforced when the UNESCO-UN in 2007, it grated the CU campus of UNAM the title of Heritage of Humanity, as the architectural design remains intact. The most recent classroom designs and built, do not meet the functional needs demanded by the deep changes that the environment surrounding the campus has suffered, and the intense growth of the population that uses of the space of the CU campus, it is estimated that in the 2018-2019 school year there will be more than 35,000 students. This large population requires mobility within the campus, which has caused a substantial increase in vehicular traffic and consequently high noise generation.

To illustrate the difficulties that arise when continuing with the original architectural design, a study is presented in the architectural complex of the Postgraduate Unit (UP) of the UNAM, due to its semicircular design it has all kinds of solar orientations, natural ventilation, exhibitions internal noise (roads), the architectural complex was built in year 2013. It shows a survey to teachers and students, of the acoustic evaluation of the classroom, by the noise generated by the vehicular passage of the road near the complex. The study focuses on two architectural solutions to the acoustic problem of comfort, considering that the classroom are enclosures where a excellent transmission must be achieved oral. Possible solutions are presented whose application will depend on the decision not to alter the obligations to maintain the title of cultural Heritage of Humanity.

Due to the above, the proposed solutions for this work are studied with the help of the software Predictor LimA Software [1], and emphasis is placed on the results obtained, so the approach is experimental and the simulation.

NOISE AS A POLLUTANT

Noise in urban and suburban localities is a constant pollution factor, becoming currently a serious problem to human health, with physiological, psychological, economic and social effects. Studies conducted in different countries have shown that 80% of noise pollution is caused by vehicular traffic in cities, due to the functional maldistribution of territory and dispersed urban development, this has led to the creation of an extensive network of streets and avenues, which connect the different areas of the city trough which different means of transport circulate in a constant and uninterrupted way [2], this often causes the lack of Interior Acoustic Comfort (IAC).

To achieve IAC, the architectural design is divided into two general aspects: a) controlling sound field generated outside to interfere minimally with internal sound field (sound insulation), and b) controlling the sound field inside the enclosure (sound absorption). The specific technical characteristics of these two aspects are defined according to the type of enclosure in question.