



**Journal Website:**  
<https://theusajournals.com/index.php/ajast>

**Copyright:** Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

## **NEGATIVE IMPACT OF ACOUSTICS ON THE EXTERNAL BARRIER STRUCTURES OF THE ARK FORTRESS**

**Submission Date:** March 21, 2023, **Accepted Date:** March 26, 2023,

**Published Date:** March 31, 2023

**Crossref doi:** <https://doi.org/10.37547/ajast/Volume03Issue03-09>

**Mukhammadov Said Karimovich**

Bukhara Engineering And Technology Institute, Uzbekistan

**Khalilov Shokhibek Otabek O'g'li**

Bukhara Engineering And Technology Institute, Uzbekistan

### **ABSTRACT**

This article provides a broad understanding of the fact that architectural monuments remain under man-made influences, different from natural ones, and measures to simulate these influences. Each architectural monument has a specific building style of its time. It was observed that the outer barrier structures of the Ark fortress fell under the influence of man-made, leading to the destruction of their structures. Accordingly, it is illuminated that the objects of the architectural monument are not an optimal solution to the surroundings and protected areas for conducting cultural and educational events.

### **KEYWORDS**

Ancient urban planning, snow, rain, wind, land subsidence, landslides and earthquakes, umurbaki, equivalent, protection area, range, speakers, border, audio Column, salutes, heavy trucks, gilded and air noise.

### **INTRODUCTION**

Bukhara "Ark fortress" is an ancient urban planning monument. The era of the reign of Abdullah Khan was a vivid element of its construction. At the moment, the structural parts of the external barrier structures of

the "Ark" fortress are under the influence of acoustic devices (audio Column) and dynamic forces arising from the blow of the wind. It is possible to list natural

and man-made influences that negatively affect the constructive part of the architectural monument.

Natural factors are: snow, rain, wind, earth subsidence, Earth displacement and earthquakes.

Man-made factors: examples will be high-range speakers (border) (audio Column), oscillations formed

from the movement of salutes and heavy cargo cars at events in the territory of the architectural monument protection. In addition, the gilded and air noise generated from traffic on roads passing through the protective part of the historical monument has a significant negative impact on the life expectancy of the monument. (Figure 1)



**Figure 1**

Of the natural factors that negatively affect the architectural monument, M. The accumulation of rain, snow waters of the Karimov, Afrosiob and Mirzo-Eid streets on the side of the monument of the roundabout road negatively affects the consistency of the mixture, which retains the strength of external barrier structures through the foundation of the architectural monument. With this in mind, it is advisable to install artificial lotocks for draining sewage depending on the slope of the area of the arch fortification. At the same time, the "Ark Citadel" is located on the brink of the inner city road, this distance is 14 meters. To limit the traffic of cars with a load of more than 5 t, which has gilded and air noise, as well as

to install natural and advertising protection screens from sound, to Green the area around the architectural monument in order to absorb sound. During car traffic, it is advisable to install signs prohibiting an alarm for motor vehicles, in addition to specially equipped and allowed cars. The surface of the Registan Square in front of the arch fortification is covered with a limestone coating. The area coating has a slope of 0.5% relative to the building. According to this wastewater does not stand still however, the type of soil layer under the coating shows a negative effect on the building base over a certain period of time that moisture storage.



Figure 2

The holding of various walks and events during the rainy season on the Registan Square of the Ark fortress leads to the fact that the vibrational architectural monument formed from sound waves emanating from

acoustics equipment has a negative impact on the strength of external barrier structures and the appearance of micropores.



Figure 3



Figure 4

Hence, the sound speed is 344 m /second when the air temperature is +20 oC. The volume of Sound Devices designed for various activities is 130 db, and the fact that such a device is installed on two points has a large resonance effect on the walls of the building.

All walls of the object are damaged by sound waves at the expense of sound reproduction of buildings around the historical monument. If the sounds emanating from the sources hit and return to certain obstacles, the sound adverb increases 2 times.

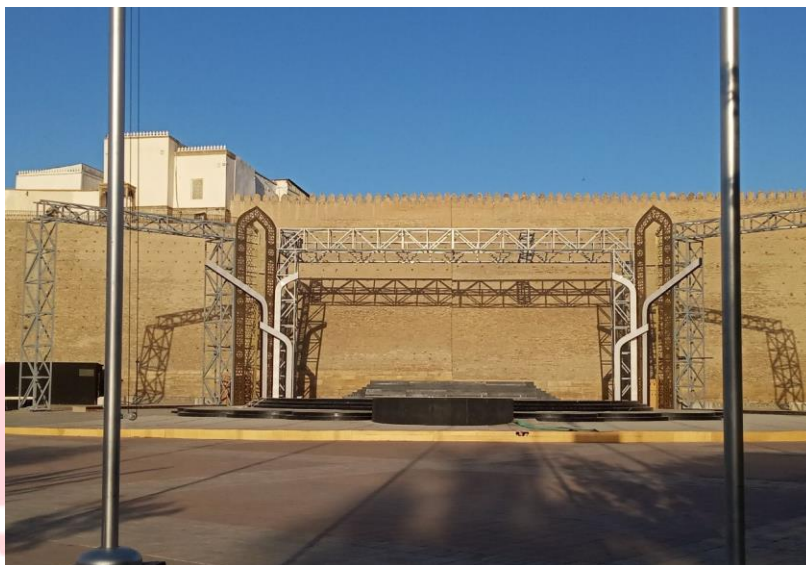


Figure 5

External barrier structures external noise absorption

$$R_{tr} = L_{Sh}^N - L_{ed} + 10lg \frac{S}{R_t} + 6db;$$

$L_{Sh}^N$ - external (street) noise pressure level, db;

$L_{ed}$ - the permissible sound pressure level of the width surrounding the building, db;

S- noise-emitting surface area, m<sup>2</sup>

$R_t$ - average sound absorption area of external barrier structures, m<sup>2</sup>

$$R_{tr} = 130 - 40 + 10lg \frac{9960}{9960} + 6 = 96db$$



This in itself has a negative impact on the load-bearing capacity of the architectural monument, as well as on the life expectancy of external barrier structures.

Table 1, presented in Table 2.01.09-19 of construction norms and rules, states that the sound equivalent level of the design of areas at Point 7 of "the most marginally permissible sound pressure, sound level, equivalent and maximum sound levels of noise entering the premises of residential and public buildings, the maximum sound level is  $L_{Amax}=55$  db. The level of sounds emanating from the sources laid on the site of the architectural monument is a total of 260 db. Such high sound vibrations cause micropores in External barrier structures to develop and become cracked. Accordingly, in order to ensure the viability of the Ark fortress and to convey its original state to the future generation, as well as to increase the tourism potential, high sound levels should not be held on the territory of the "Ark fortress". By doing this, we will preserve another architectural monument, which is the center of attention of tourists, with its bricks, which speak of its era, and the majestic building tower.

## REFERENCES

1. Повышение эффективности звукоизоляции зданий. Киев, издательство «Будивельник» 1978 г.
2. М.Н.Гусевнинг "Основы строительной физики" §13. Расчеты звукоизоляции ограждающих конструкций Сройздат 1975 г
3. Салимов О.М. "Ўзбекистон архитектура ёдгорликларини сақлаш ва улардан фойдаланиш". Монография. – Тошкент; "Наврўз" нашриёти, 2020, 320 бет.
4. Рабиев Ғ.Б., Мухаммадов С.К. "Анализ истории строительства и конструктивных решений архитектурных памятников Бухары" (на примере ансамбля Пойи-Калон). Монография. Бухоро-2021 "Дурдона" нашриёти, 2021, 99 бет.
5. Х.Р.Рўзиев, Ж.Т.Тошев "Бухоро меъморчилигида архитектуравий бионика". Монография. Бухоро-2021 "Дурдона" нашриёти, 2021, 160 бет.