

Telajakan (Green Open Space of Balinese Architecture) as A Noise Barrier in Bali

Eka Putra Setiawan, Ngakan Ketut Acwin Dwijendra, I Putu Yupindra Pradiptha

¹ ORL-HNS Departments, Medical Faculty of Udayana University

² Architecture Departments, Technique Faculty of Udayana University

Abstract

Introduction: Noise is one of the problems that occur in cities and brings adverse effects to human health and the environment. Telajakan is one of the traditional green open spaces in Bali that physically provides beauty and fresh air also can be used as a noise barrier.

Methods: This is experimental research with the aim to find differences in the intensity of noise inside and outside of Telajakan. The location of the study was in the city of Denpasar. Noise intensity is measured from two places. One meter in front of Telajakan and one meter behind Telajakan. Intensity of noise is measured by a sound level meter.

Results: The average measurement results with a distance of one meter in front of the Telajakan are 53.0 ± 4.76 db. The average measurement results with a distance of one meter behind Telajakan are 38.25 ± 10.27 db. With the presence of Telajakan (green open space) there is a decrease in the average noise of 14.75 ± 8.22 db.

Conclusion: Telajakan as a Balinese cultural heritage that can be used as a noise barrier. Telajakan as a green space Balinese architecture that is full of aesthetic, security, social and spiritual meanings.

Key words: Noise, Telajakan, Sound Level Meter

INTRODUCTION

Noise is one of the problems that occur in cities. This is because it has a bad impact on humans and the environment. The lack of Green Open Space is one result of noise. Green open space not only functions as the lungs of the city, but green open space is also a noise barrier in cities. The sources of noise vary, ranging from buildings such as industrial plants and highways, that is the sound of vehicles. City Green Open Space is a part of urban spatial structure that functions as a green urban area that is physically beneficial, namely providing beauty and fresh air between the density of buildings and also socially beneficial as a place of interaction and social activities.

However, the large level of urbanization in the city has an impact on the high utilization of space or land and has resulted in changes to the open space of the city. Telajak is one of the traditional open spaces (*karang suwung* and *karang tuang*) besides *natah*, the sanctity radius of the temple, *setra*, town square, and others. Telajakan is a line arranger between the roadside wall (*penyeker*) and a gutter (*jelinjangan*) which is decorated with traditional plants for spiritual and economic activities. Telajakan as a legacy of Balinese ancestry is a front garden of houses in Bali that is full of aesthetic meanings, security, social and spiritual meanings.²

Telajakan is a strip of traditional green space between the wall of a housing compound and a ditch/pedestrian path in a roadside (Figure 1). The width of telajakan is determined by Balinese traditional architecture, which case between 1.0 and 2.2 meters, and by Bali Regulation No. 10/1999, which case between 0.5 and 2.0 meters. Traditionally Telajakan has multiple functions such as provision of plant and flower materials for Balinese daily rituals, regulation of storm water from the property, and offering semi-public space for street vendors and neighbors⁶. With regards to the functions of telajakan, literature review shows that the primary functions of the plants in telajakan are religious and economic. Plants are used for religious ceremonies, medicinal purposes, spice, aesthetics, and micro economy. Telajakan provides a space to place the penjor during traditional ceremonies.⁷



Figure 1. Picture of Telajakan⁶

METHODS

This research is an experimental research with the aim to look for differences in the intensity of noise inside and outside of Telajakan as the application of Telajakan (green open space of Balinese architecture) as a noise barrier. The location of the study was in the city of Denpasar. This research will be conducted in approximately 4 months (March 2018 to June 2018). Sound is measured from two places. One meter in front of the telajakan and one meter behind the telajakan. Noise is measured by a sound level meter. The statistical test used is the t test of two free samples using a p value at α 0.05. Significant relationship if the p value is ≤ 0.05 .

RESULTS

Table 1 Noise Measurement Results

No	Place of Measurement	Time of Measurement	One Meter in front of Telajakan		One Meter Behind Telajakan	
			Minimum Intensity	Maximum Intensity	Minimum Intensity	Maximum Intensity
1	Telajakan 1	09.10	60 db	80 db	50 db	72 db
2	Telajakan 2	09.20	50 db	77 db	40 db	67 db
3	Telajakan 3	09.45	52 db	78 db	25 db	52 db
4	Telajakan 4	10.00	50 db	74 db	38 db	65 db

Table 2 Noise Measurement Description

Place of Measurement	N	Mean	Deviation Standard	Error Mean Standard
One Meter in Front of Telajakan	4	53.0000	4.76095	2.38048
One Meter Behind Telajakan	4	38.2500	10.27538	5.13769

Based on the results of the independent sample t test, the Sig value (2-tailed) is obtained as $0.04 < 0.05$, it is concluded that there is a difference between the average noise intensity in front of and behind the telajakan.



Figure 2. Telajakan Research Location

DISCUSSIONS

The World Health Organization or WHO reports that high noise in the work environment is still a problem throughout the world. It has been reported that in the United States more than 30 million workers are exposed to noise with a high enough intensity. Whereas in Germany around 4-5 million workers (12-15% of the working population) are exposed to noise which is declared dangerous by WHO.⁴

According to the American College of Occupational and Environmental Medicine or ACOEM, noise with an intensity of 85 dB or more can cause damage to the hearing receptor of organ of corti in the inner ear. The deafness is cochlear nerve deafness and usually occurs in both ears. Continuous exposure to noise throughout the day and for years causes more damage compared to intermittent noise exposure with a rest period.⁵

Telajakan is a line arranger between the roadside wall (*penyeker*) and a gutter (*jelinjingan*) which is decorated with traditional plants for spiritual and economic activities. Telajakan as a legacy of the Balinese ancestral is a front garden of houses in Bali that is full of aesthetic, security, social and spiritual meanings. In the context of space, telajakan serves to widen the distance of views, as building security system, provide intimacy, and as a place for reforestation and identity of an environment, so that telajak is also categorized as one of the elements of traditional green open space in Bali. Whereas in the spiritual context, telajak is a place to plant *penjor* during religious ceremonies as well as a profane area in the context of Balinese architecture. Physically, there are three main functions of telajak, namely as reforestation, maintaining the environment and maintaining the building boundaries for the safety and comfort of the building and its environment.³

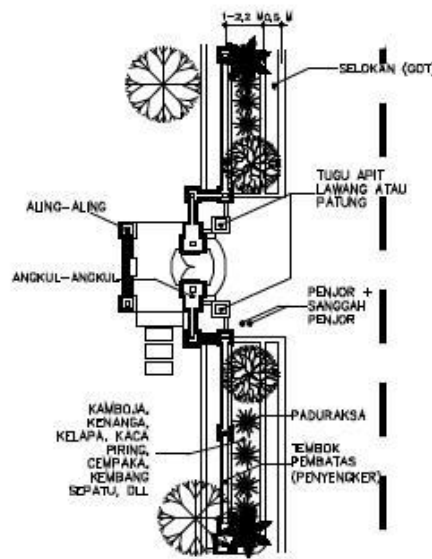


Figure 3. Layout, Dimensions and Elements of Telajakan¹

The average results of measurements with a distance of 1 meter in front of the telajakan are 53.0 ± 4.76 db. The average measurement results with a distance of 1 meter behind the telajakan are 38.25 ± 10.27 db. With the presence of telajakan (green open space) there is a decrease in the average noise of 14.75 ± 8.22 db. Between telajakan and ecology, has a very close relationship. Telajakan has a role in maintaining environmental balance. With the presence of telajakan, the environment becomes organized so that it is balanced. Water infiltration land is still maintained by telajakan. Not all buildings are built, the rest of the land in the housing complex is formed as a telajakan, this part will later become a water infiltration area because as we all know buildings made of concrete cause difficult water to seep into the ground. Groundwater reserves are still available with telajakan assistance as water absorption to the land during the rainy season. In addition, telajakan also produces O_2 with the presence of plants grown on telajakan. Thus, the availability of O_2 in nature will still be balanced. Telajakan also keeps the biodiversity reserved.

CONCLUSION

Telajakan is a green open space of Balinese architecture that can be used as a noise barrier. Telajakan as a legacy of the Balinese ancestral is a front garden of houses in Bali that is full of aesthetic, security, social and spiritual meanings.

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CONFLICT OF INTEREST

There is no conflict of interest

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