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Kentong Damping Sound Intensity Level Based on *Kentongan* Length Variations

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Abstract

This study aims to determine the attenuation of the sound produced by a *Kentongan* musical instrument based on variations in the length of the *Kentongan*. Data were collected in a quiet room by starting to measure the noise and atmosphere of the room. This study used Sound Meter Software with version 3.4.5 with a maximum sound intensity limit of ∼ 90 dB, mobile as an intermediary. This study used *Kentongan* with a length of 1, 29 cm and a length of 2 that was 34.1 cm. Experiments were carried out 3 times with the first experiment without *Kentongan*, then *Kentongan* 1 and then *Kentongan* 2. The sound intensity produced by without *Kentongan* is an average of 60.08 dB, then with *Kentongan* 1 that is, with an average of 61.86 dB, and *Kentongan* 2 with an average of 56.68 dB.

Keywords: intensity level, sound, bamboo, *kentongan*.

1. Introduction

Indonesia is famous for its natural wealth, one of which is bamboo trees. Bamboo has a unique history. Namely, during the colonial period in Indonesia, fighters used weapons in the form of sharpened bamboo, namely bamboo, which was sharpened as a means of resistance against Dutch colonialists. In addition, bamboo is also used as a learning medium, for example, learning media on traditional musical instruments such as *kentongan*, bamboo flute, angklung, and can be used as a learning medium according to what has been studied, namely the level of sound attenuation intensity in *kentongan*. (Siti Sarah: 2015, 150). Sound waves are waves generated from vibrating objects called sound sources. The source of the sound can come from living things in the form of vibrating vocal cords and also inanimate objects that are vibrated.

Sounds can reach the ears of living things if three conditions are met, namely, there is a sound source, a listener, and a propagation medium, namely solid, liquid, or gas. If one of the conditions is not met, the sound cannot be heard. So, sound functions to send messages from the message giver or sound source to the listener. Conversation, sound cues, and a song are messages conveyed by means of sound.

Kentongan is a beater made of carved bamboo or teak sticks. *Kentongan* is often identified with ancient communication tools that are often used by people living in rural and mountainous areas (Erwina, 2013).

Bamboo is one of the non-timber forest products from grasses which has basic characteristics that are not much different from wood, even in some cases it has distinctive advantages and characteristics that have the potential to be developed as a substitute raw material or alternative raw material in the processing wood-based industry (Gusti Made Oka, 2005).

Based on observations in Wajak sub-district in Codo Village, 11 plots with 12 types of bamboo were found, including apus, jawa, petung, ampel, rampal, ori, jabal, wulung, and wuluh bamboo (Febriliani, 2013). And bamboo can also be grouped into 75 genera, and 1250 types of bamboo growing in the world Morisco (Morisco, 1995, page 13-15 in Nassend, 1995) reported 56 types of bamboo native to Indonesia that have the economic potential to be developed. The international research community has identified ten priority species to be developed, including native bamboo from Indonesia.

2. Experiments Procedure

This research was conducted in an empty and quiet house. Initially, we measured the noise of the place, such as wind and other sounds. Then we tested others such as short and long *kentongan*. We did five times repetition of data for each group; then we took the average of each data.

3. Results and Discussion

The results obtained were frequency spectrum analysis produced by *Kentongan* with the number of holes 1 of which 2 of the *kentongan* have different lengths tested five times. The spectrum of sound produced from small and large *kentongan*. Figure 1 is a spectrum of sound waves generated from the experiment 5 times; through software a graph can be formed and be seen in Figure 1. Then it can be seen the resulting spectrum of small *kentongan*.
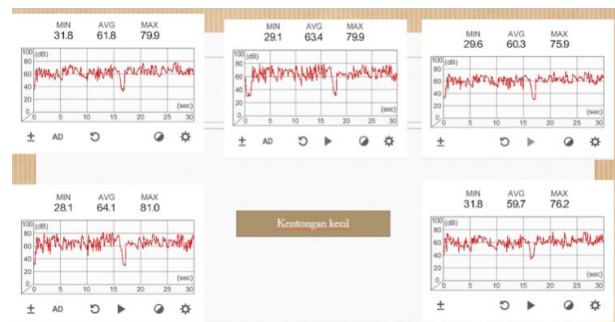

Figure 1. Above is the spectrum of sound waves produced from small *kentongan* with 5 experiments.
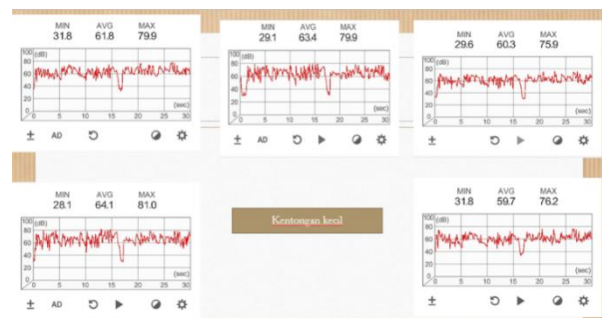

Figure 2. Above is a spectrum of sound waves produced from big *kentongan* with 5 experiments.

Based on the spectrum display in Figure 2, namely the Big *Kentongan* with 5 experiments, it can be seen the frequency spectrum results obtained from the Big *Kentongan*. The following are the results of the sound intensity level produced without a silencer.

Table 1. Sound intensity level without silencer

No	Ti	Tī	Ti-T ī	(Ti-T ī)^2
1.	62.8	60.08	2.72	7.3984
2.	58.7	60.08	-1.38	1.9044
3.	58.9	60.08	-1.18	1.3924
4.	63.0	60.08	2,.2	8.5264
5.	57.0	60.08	-3.08	9.4864

The calculation, it is found that the error is ± 1.12; the error is too large because the noise level is too large. So the intensity of the sound produced without *kentongan* is 60.08 ± 1.12 (cm). Following are the sound intensity results produced by a short *kentongan* with a length of 29 cm.

Table 2. Sound intensity level with a length of 29 cm.

No	Ti	Tī	Ti-T ī	(Ti-T ī)^2
1.	63.4	61.86	1.54	2.3716
2.	64.1	61.86	2.24	5.0176
3.	61.8	61.86	-0.06	0.0036
4.	59.7	61.86	-2.16	4.6656
5.	60.3	61.86	-1.56	2.4336

Table 3. Sound intensity level with a length of 34.1 cm

No	Ti	Tī	Ti-T ī	(Ti-T ī)^2
1.	56.0	56.68	-0.68	0.4624
2.	56.7	56.68	0.02	0.0004
3.	56.5	56.68	-0.18	0.0324
4.	57.5	56.68	0.82	0.6724
5.	56.7	56.68	0.02	0.0004

The calculation, it is obtained that the error is ± 0.85. So the intensity of the sound produced without *kentongan* is 61.86 ± 0.85 (cm). The following are the results of the sound intensity produced by a long *kentongan* with a length of 34.1 cm.

The calculation, it is found that the error is ± 0.24, so the intensity of the sound produced without *kentongan* is 56.68 ± 0.24 (cm). The results of research and calculations show that shorter *kentongan* has a greater level of sound attenuation intensity.

4. Conclusion

The research results found that the intensity of the short *kentongan* was greater than the long *kentongan*. The researcher hopes that further this research can be continued using more variations in length and differences between dry and wet types of bamboo.

Acknowledgment

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