



ASSESS THE GAMELAN APPEAL MADE OF STEEL, TIN BRONZE, SILICONE BRONZE TO THE RESULT OF LONG SOUND (RESONANCE) AND SOUND INTENSITY (DECIBEL)

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KEYWORDS

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ABSTRACT

This study aims to determine the effect of material differences in the composition of gamelan materials to acoustic properties of long sound results (resonance) and the intensity of sound (decibels). Steel, bronze tin white and silicone bronze are the material studied in Javanese gamelan gong kempul barrel 5 slendro. Making gamelan using sandcasting casting process. Then do the process of forging to get the form of the gamelan made. Gamelan is then tested by using Neundo software and some tools are: software, condenser microphone, audio interface and cable. The results of this study show the longest resonance in silicone bronze gamelan with an average sound duration of 15.4 seconds, gamelan bronze white tin material with a sound duration of 7.4 seconds and gamelan iron material with a duration of 6.6 seconds. The sound intensity resulting from the silicon bronze gamelan has a gain value of -23.34 dB. While in gamelan of white tin bronze material equal to -21,68 dB and gamelan of iron material has gain value equal to -17,96 dB. With the tests performed then the results obtained differences and increase the quality of resonance and sound intensity

INTRODUCTION

A set of traditional gamelan instruments became one of the most important objects in the scope of music and musicianship among the thousands of other instruments in the world. Many reasons to make the gamelan as the object of research due to aspects of the features found in the gamelan. Aspects of the privilege is on the aspect of audio and visual. Features of the audio aspect include: tone color, barrel (scale system), embat (interval), and sound wave, while the features in visual aspect include: shape, construction, material used, and ornaments of the gamelan the.

As the times progressed, gamelan material has several types. Starting from the gamelan with iron material that is 100% of the material consists of iron (Fe), brass gamelan with 55% Cu and 45% Zn, and bronze gamelan with its composition of 73% Cu and 23% Sn (Rustopo, 1980) . The sound produced by the gamelan is influenced by the material type of material (Mitrayana et al, 2014).

Anom et al (2018) argues that a good gamelan will produce a long sound when hit (hit), where good acoustic properties that can produce a long sound (low damping vibration) (Lisovskii, 2007). To mangatasi it silicon bronze engineering (CuSi) as an additional bronze tin white bronze to obtain better acoustic and mechanical properties.

RESEARCH METHODS

This study was conducted to determine the acoustic properties of long sound (resonance) and the sound intensity(decibel) of some gamelan material. The gamelan materials tested were gamelan material of steel material

(FeC), tin bronze (CuSn) and silicone bronze (CuSn + 4 Si). The sample in this research is gamelan type gong kempul with diatonic tone 5 slendro measuring $\pm \text{Ø}50 \text{ cm} \times 50 \text{ cm}$ and thickness 2 mm.

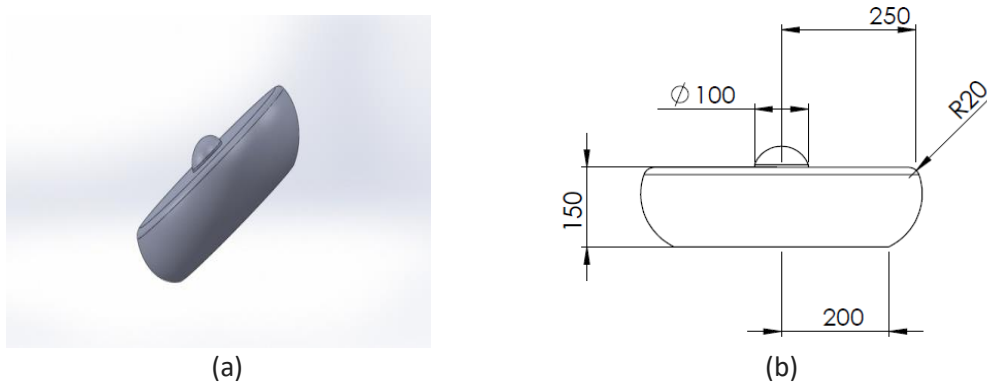


Figure 1. (a) Kempul (b) Kempul Size

The testing was done by doing a punch with a moderate intensity. Gamelan kempul was played by beating intensities

Research on long sounds and sound intensity was done using software tools, audio interface, condenser microphone and cable. Data collection is done in a conditioned music studio. Then the gamelan is placed in accordance with its usefulness and given a microphone condenser on the back of the gamelan that has been connected to the audio interface using a cable to the software that has been using Neundo software. Each gamelan takes 5 beats with medium intensity which then each beating, the data will be read by the software statistically, graphically, visual and record

RESULTS AND DISCUSSION

Long Sound (Resonance)

Based on test results and data on long sound results in each gamelan material, the difference between gamelan of iron material (FeC), bronze tin white (CuSn) and silicon bronze (CuSi) was obtained. Specimens of gamelan iron material (FeC) obtained an average resonance value of 6.6 seconds. The specimen of white tin bronze material gamelan (CuSn) obtained a value of 7.4 seconds. While the specimen of silicon bronze material (CuSi) obtained a value of 15.4 seconds

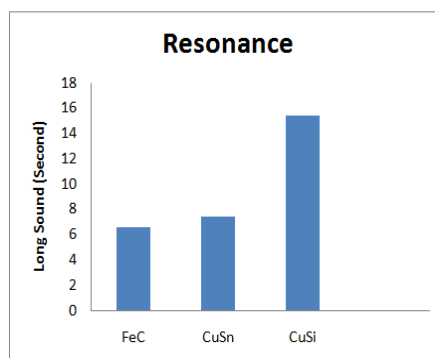


Figure 2. Resonance

Where the damping capacity produced by the white tin bronze gamelan (CuSn) is lower than the silicon bronze gamelan (CuSi). The dimensions of tin bronze gamelan have a higher hardness than silicon bronze. The hard material has a finer and denser structure so that the gap between the grains is very small. Fine grains form many grains that block the movement of dislocations. When the gamelan gets vibration the vibrational energy is not lost but passes through many structures formed by the bond between the material structure grains

Sound Intensity (Decibel)

The test results on the sound intensity of each gamelan material, obtained the difference in yield between gamelan iron material (FeC), bronze tin white (CuSn) and silicon bronze (CuSi). Specimens of gamelan iron material obtained

value -17.96 dB. The gamelan specimens of bronze material obtained a value of -21.68 dB. While the silicone bronze material specimen brings the value of -23.34 dB.

The result of the sound intensity test has minus value because basically the gamelan is a musical instrument that is played or hit produces a weakening value of the output signal to the input. Intensity the biggest sound is owned by the bronze gamelan with the addition of silicon ie the average gain value of -23.34 dB, while the lowest in gamelan with iron material with a gain value of -17.96 dB.

The data obtained from the research results obtained the value of maximum and minimal gain, where at each gain can be known for the maximum strength of the gamelan sound intensity of each beating (beating at the test is done with the same intensity of beating). Where in iron material gamelan value of its gain shows minus at number 17,96 from result then it is known that result of sound intensity of musical instrument have intensity strength value equal to 17 dB and weaken output signal from to input. The greatest sound intensity is in gamelan with bronze material of silicon addition with gain value minus with value 23,34 which shows that this gamelan have intensity value 23 dB and attenuation of output signal to input.

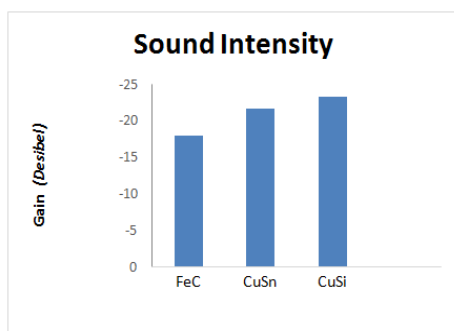


Figure 3. Sound Intensity

CONCLUSION

The addition of silicone material elements to the gamelan of bronze material is proven to increase the result of long sound obtained. This is because the composition of the gamelan material with the addition of silicon has a heavier dimension of the size of the material so it can making the material can produce long sound results (resonance) longer than with bronze tin white and iron material

Longest resonance (long resonance) results are in silicone bronze gamelan with an average sound duration of 15.4 seconds and the sound intensity produced by silicone bronze gamelan is higher than gamelan gamelan of bronze tin material and gamelan of iron material

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