

Sound Dampening Device Using Attenuator

Bharathi.K¹, Saima Sabrin², Keerthisree.K.M³, A.Shashidhar⁴, A.Sharanabassapa⁵

¹²³⁴⁵EEE Department R Y M Engineering college

Abstract- Increasing sound pollution has to be controlled, as it leads to various health issues like cardiac vascular problem, deafness and dumbness, psychological instability and also result in an environment which is not suitable for living. Sound dampening device helps in reduction in loudness of noise. It works on the basic principle of attenuation. It is a device that weakens the amplitude of incoming sound wave from atmosphere or sound source to a desired value without any distortion. Variable attenuator generally used in radio broad casting stations is used in the design to control the volume of the signal. The device uses highly sensitive components to observe the minute change in various decibel levels, furthermore the design is adaptive to all environments.

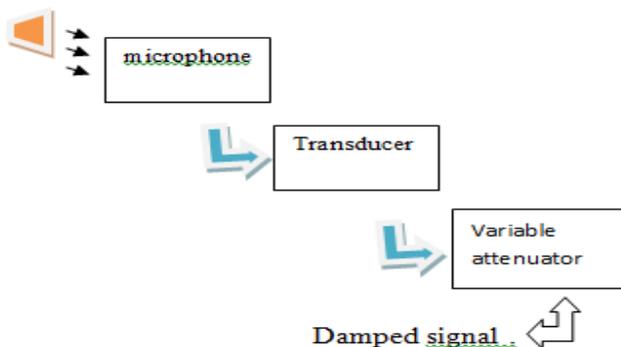
1. INTRODUCTION

A Sound wave is pattern of disturbances caused by the movement of energy travelling through a medium. Sound is a wave, as waves can transport energy through a medium without transporting medium itself. Air is a typical medium for situation involving sound waves. Sound wave can travel through all kinds of different material like water, metal, human flesh and bone. Speed of sound is determined entirely by the properties of the medium in which it is travelling. The properties that determine the speed of sound are

- 1.Stiffness (stiffer medium=faster sound waves)
 - 2.Density (denser medium=slower sound waves)
- $V_{solids} > V_{liquids} > V_{gases}$, because solids are more rigid than liquids, liquids are more rigid than gases. Speed of sound at 200c is 343m/s

II. CONSTRUCTION

The typical block diagram of sound dampening device is as shown in fig below. The sound passes through sound sensor, transducer and variable attenuator to achieve output. speaker



Generally loud speaker convert power energy into sound, the sound wave from loud speaker (amplifier) is primarily sensed by sound sensing device called microphone's which produces analogous output which is the input to the transducer. The transducer converts the non electrical quantity into electrical quantity. The output of transducer is power in watts, indicates

the intensity of the input wave i.e., 400 watts indicates 113db, 1 watts indicates 87db. Variable attenuator usually consist of pure resistance. The power through variable attenuator is dissipated in accordance with the need of users, corresponding amount of resistance is included in the design feature. Power dissipation may cause heat in the device which is overcome by providing heat sink in the circuit.

APPLICATIONS

The device finds its application in premises near temple, mosque, etc., where loud music is encouraged. In industries, power plants where loud environment is created. In metropolitan city roads which is miserably has huge traffics all over the day. It may also be effective in hospitals, Schools etc.,

CALCULATIONS

The Intensity of sound wave is given by $I=P/A$.

Where P=power in watts.

A=area in m² . ($A=4\pi r^2$).

The basic decibel equation (β)= $\log_{10}(I/I_0)$ (10-12W/S²)

Where 10⁻¹²w/s² is the sensitivity of human ears also

$\beta = \log_{10}(p/p_0)$

all these above equations are used in calculating the db

The speed of the wave is given by $V=\lambda f$

As frequency increases, the wavelength decreases by same factor and speed remains same

$v=(\beta/\delta)^{1/2}$

where β =young's modulus in Pascal

δ =density in kg/m²

As β increases, v increases

ADVANTAGES

The device reduces the noise pollution to an extent.

It blocks external sound in to the home.

The device is free from complex working.

Little or less maintenance cost.

Easy to install, wireless.

Can be generated and marketed at affordable cost.

It indirectly helps in reducing the health issues.

Eliminates the discomfort with sound.

FUTURE SCOPE

The WHO list 7 categories of adverse health effects.

- ✓ Impaired hearing.
- ✓ Interference with verbal communication.
- ✓ Disturbed sleep.

- ✓ Heart trouble.
- ✓ Mental health impaired performance.

Social behavior and annoyance, and one of the major reason for these adverse effects is noise pollution. Hence eliminating the effect of noise is important worldwide in future.

DISADVANTAGE

- Dynamic range is reduced.
- The directivity of a reflection measurement is degraded by two times the attenuation of the pad in db.
- The number of devices increases with increase in coverage area.

III. CONCLUSION

Due to the alarming rate of spread of effects of noise pollution , both the developed and developing countries find hindrance in the path of comfort zone of living. Especially countries like India, which is known for its tradition and culture, encourages loud music which forms major part of their celebration resulting in various environmental, social and health issues. Considering the above major consequences ,there is need of controlling the sound. The sound dampening devise controls the sound and its pollution to a greater extents by which it could bring, pleasant home ,safe and sound less society. it act as a barrier in preventing the harsh and loud noise ,which is beyond the sensitivity of human ear. On a overall note sound dampening device will ensure peace, harmony , joy in life of every individuals.

REFERENCE

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