

# Implementation of Acoustic Materials in the Auditorium of Daya Indonesia Performing Arts Academy (DIPAA) Music Institute

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## ABSTRACT

Selection of good acoustic material is important in the design of the auditorium interior. The function of acoustic materials is to achieve perfect sound hearing conditions, which are pure, even, clear, and not buzzing. In application, sound acoustic material is divided into sound absorbers and sound silencer, both of which are needed not just one of them. Designing the auditorium that has good acoustics can be determined through the selection of materials used, namely by using qualitative methods so that the designer can find out the characteristics of the material in accordance with the auditorium. Some acoustic materials such as glasswool and rockwool are commonly used, but there are sound absorbers and silencer that have better quality in terms of their functions and characteristics. The results obtained when using acoustic materials such as Polyethylene Terephthalate (PET) and Acourete Mat Resin 2A, the quality will be better because the material is very durable and can absorb and dampen sound very well compared to other acoustic materials.

**Keywords:** *absorbent, acourete mat resin 2a , acoustic , polyethylene terephthalate, silencer*

## 1. INTRODUCTION

Currently, the need for the use of materials to complete the interior of a building is needed for many people. This also happens to the selection for acoustic materials that are more widely used in rooms that require good acoustic quality, such as theater, auditorium, cinema, and so on.

Acoustic materials are materials that are divided into 2 types, namely sound absorber (absorbent) or sound silencer (insulation). Acoustics supports sound perfect hearing, that is pure, clear, and not buzzing so that it's the same as completely, free of defects and successful. (Suptandar, 2004, p. 1)

The type of material is not small, but many variations and each of these materials has their own characteristics, functions as well as the advantages and disadvantages of each. Necessary, compile a person needs these materials, then he needs to consider what he needs and what characteristics of the material that matches his needs.

At the music institute, Daya Indonesia Performing Arts Academy (DIPAA) asked for an auditorium that needed a soundproof music room and was able to produce good music compilation to be heard by the audience, so this research aims to get

conclusions about what kind of acoustic material is suitable for use in the auditorium of the music institute.

## 2. METHOD

The method applied in this analysis is using a qualitative method because this analysis aims to determine the quality of acoustic materials that will be used for the auditorium of the Daya Indonesia Performing Arts Academy (DIPAA) music institute. According to Strauss and Corbin in (Cresswell, 1998, p. 24), what is meant by qualitative research is the type of research that produces findings that cannot be achieved or obtained using statistical procedures or other ways of quantification (measurement). Qualitative research in general can be used for research on community life, history, behavior, organizational functioning, social activities, and others. One reason why this analysis uses qualitative methods is the experience of researchers who have seen and used the material directly and is also supported by literature review sources.

The method of analyzing for the data is produced through observation and literature review,

in which the theories encountered can be a source of knowledge of the characteristics and quality of each of the acoustic materials.

### 3. RESULT AND DISCUSSION

The auditorium needs some acoustic material that can absorb and silence sound well.



Figure 1 Auditorium Visualization  
(Source : Merthayasa, 2008)

Table 3. 1 Acoustic Material Capabilities

| No | Material                         | Absorber | Silencer |
|----|----------------------------------|----------|----------|
| 1  | Glasswool                        | Yes      | No       |
| 2  | Polyethylene Terephthalate (PET) | Yes      | Yes      |
| 3  | Acourete Mat Resin 2A            | No       | Yes      |
| 4  | Rockwool                         | Yes      | No       |
| 5  | Accoustic Absorbent Foam         | No       | Yes      |

Source : (Acourete, 2005)

Acoustic materials in the form of sound absorbers or absorbers there are several types, the following is an explanation:

#### 3.1 Glasswool



Figure 2 Glasswool Visualization  
(Source : Acourete, 2005)

Glasswool is a silencer made of wool textured fiberglass with a thickness of 25mm-50mm. NRC on this material is relatively small and in its use is not durable because this material can absorb water so that there can be a decrease in sound absorption;

#### 3.2 Polyethylene Terephthalate (PET)



Figure 3 Polyethylene Terephthalate (PET)  
(Source : Dekoruma, 2020)

This material is widely used by manufacturers because of the function which can be both an absorbent and a silencer. Its ability to block sound is better than other materials. PET is very easy to shape and apply and safe to use because it comes from recycled material;

**3.3 Acourete Mat Resin 2A**



Figure 4 Acourete Mat Resin 2A Visualization  
(Source : IDEA, 2019)

Material capable of making spaces impermeable, this material is in the form of black sheets made of rubber and a mixture of chemicals. The installation is very easy. This material can insulate sound better than other materials and its durability can be more than 15 years;

**3.4 Rockwool**



Figure 5 Rockwool Visualization  
(Source : Acourete, 2005)

Rockwool is a sound - absorbing material composed of lightweight mineral fiber products that can absorb sound and heat. Rockwool is a non-flammable material, but this material is not durable because it is easy to fall out so it is not safe enough to use;

**3.5 Acoustic Absorbent Foam**



Figure 6 Acoustic Absorbent Foam Visualization  
(Source : Acourete, 2005)

Is a sound dampening foam that can eliminate echoes in the room and improve sound quality in a room so as to produce sound in the room to be more comfortable to hear, this silencer foam while reducing sound leakage out of the room.

The auditorium of the Daya Indonesia Performing Arts Academy (DIPAA) music institute requires a soundproof room and is able to produce good music. The area of the auditorium is quite wide, that is 480m<sup>2</sup> with a height of 4m.



Figure 7 DIPAA's Auditorium  
(Source : Gunadi, 2020)

In this design, the auditorium uses Polyethylene Terephthalate (PET) material on the left and right side walls to reduce and absorb sound. In addition, Acourete Mat Resin 2A is also used in the back wall of the auditorium as a filler in the wall, then coated with plywood and padded wall.

Both materials were chosen because they were in accordance with DIPAA auditorium requirements. Glasswool, Rockwool, and Acoustic Rural Absorbent Foam material based on the quality is less than the maximum when used in an auditorium that

requires excellent acoustic quality in muffling and absorbing sound.

Acoustic Polyethylene Terephthalate (PET) and Acourete Mat Resin 2A materials are used as one of the wall materials used in the auditorium, but will be finished with other materials such as wall panels, padded walls, etc. so that the sound quality and aesthetics become more maximal.

#### **4. CONCLUSIONS**

Based on the results of the study it can be concluded using Polyethylene Terephthalate (PET) material, it is very good at reducing or absorbing sound, but if you want to add more sound dampers, then using Acourete Mat Resin 2A can be the next choice, because both of these materials are the best acoustic material based on its function compared another.

Auditorium of the Daya Indonesia Performing Arts Academy (DIPAA) music institute uses both materials in interior design so as to produce good acoustic quality. Material Polyethylene Terephthalate (PET) and Acourete Mat Resin 2A are then finished with interior materials so that it looks aesthetically good.

This research still has some shortcomings, namely the completeness of the data presented, it is hoped that in subsequent studies it can present more complete, solid, and clear data.

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