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SUITABILITY STUDY OF DISPOSABLE MASK WASTE AS AN ACOUSTIC ABSORBER MATERIAL

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International Symposium and Workshop
on Sustainable Buildings, Cities, and Communities
"Building Low Carbon Future: Decarbonizing with Impact"





Introduction

- Masks are generally made from **spunbond fabric** which is **a type of non-woven or non-knitted fabric made from polypropylene**. Spunbond fabric are disposable masks and can be thrown away immediately.
- Therefore, our research very important to **experiment with masks as an acoustic material**. The results of this experiment can be used as a basis for **finding out whether masks can be used as acoustic materials**.



Background Literature

- Use of Mask Waste as an Absorber Sound (Privera, Anwar, Noviadi (2023))

The thickness of the mask can be said to influence the effectiveness of the material in dampening sounds with certain frequencies. **This test aims to measure the sound absorption coefficient at the thickness of the acoustic material, namely 0.5 cm, 1 cm and 2 cm and used frequencies of 250 Hz, 500 Hz, 1000Hz and 2000Hz.** The results showed that a mask with **2 cm thickness had a better ability to reduce sound, namely 0.37, at a frequency of 2000 Hz.**

Method

- Tube method (impedance tube) is used to **measure the sound absorption coefficient, as well as determine the characteristics of the acoustic properties of a material.** This tube method testing tool is equipped with a test tube, microphone and sound source

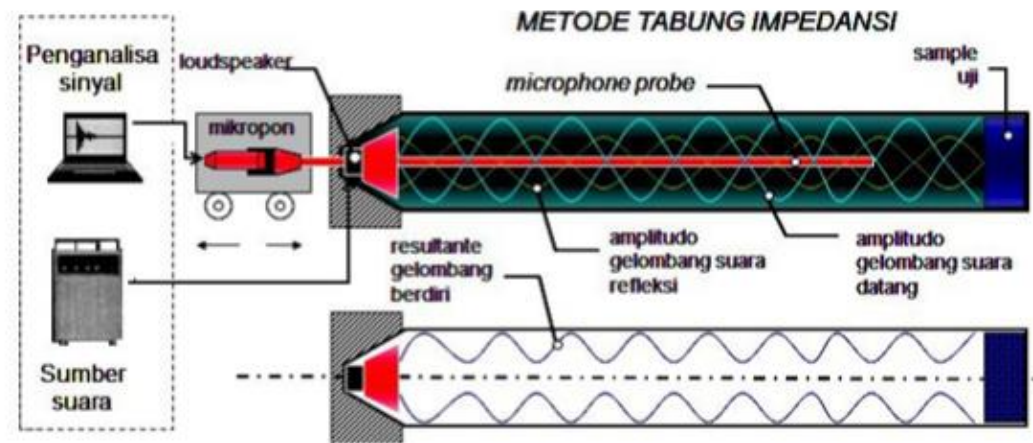
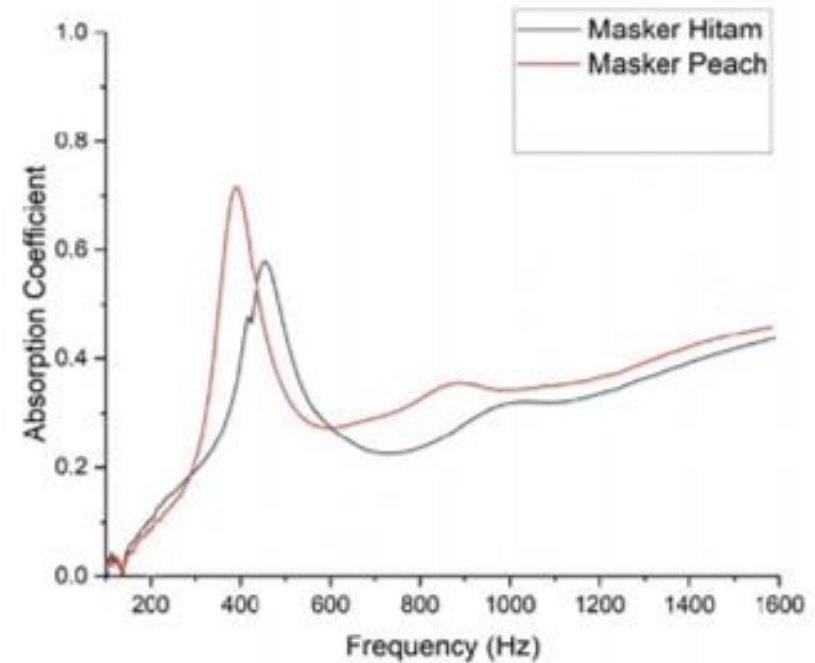


Figure 1. Research using the Impedance Tube Method.

Result

Table 1. Absorption coefficient testing system for black masks and peach masks.

Frequency (Hz)	Absorption Coefficient (α)	
	Black Mask	Peach Mask
300	0.20	0.15
400	0.48	0.70
500	0.40	0.33
600	0.25	0.28
700	0.23	0.37
800	0.25	0.30
1000	0.30	0.35





Discussion

- The frequency results of 400 Hz with the highest absorption results of 0.70 from the peach mask and 0.48 from the black mask **have met the minimum limit as a sound absorbing material.**
- However, at **600 Hz frequency has a very drastic decrease**, namely 0.28 from the peach mask and 0.25 from the black mask, which at this frequency is not suitable as a sound absorbing material because **the absorption coefficient value is still low.**
- The acoustic material of this mask is only **suitable for use at a frequency of 400 Hz**, because the **absorption coefficient value is above 0.3.**



Conclusion

In accordance with the absorption coefficient value that must be met, namely at least 0.3, Doelle (1993).

- **The results of the 200 Hz frequency sample variation were said to be ineffective at reducing sound.**
- The highest value for the peach and black masks sample is at a **frequency of 400 Hz**. Which, it **can be categorized as acoustic absorber panels or sound absorbers**.
- It is stated that the **black mask requires 50 masks** and the **peach mask requires 27 masks to have a thickness of 2.5 cm**, which is where the unit thickness of the mask **greatly influences its thickness**.



References

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