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Sustainable building material for noisy urban residential space

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Abstract

Researches on noise control have been conducting until now. Eventhough correlation model of housing orientation to airport's runway was found out, it would be better if housings are equipped by materials which can absorb noise. This paper will refresh the housing master plan design near airport continued with the possibility of housing on controlling noise disturbance. Method used is descriptive analysis on reviewing sustainable materials for low cost housings. Results of researches show that wood sawdust and coconut fibre panel have quite good acoustical performances and could be used to be wall layering in noisy urban housings.

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*Keywords:*acoustical theory; housing master plan design; absorber materials.

1. Introduction

The number of houses in Indonesia always increases. City noise problems will always be associated with the three main sources of noise, such as transport, heavy equipment and factory activity (Setyowati, E & Sadwikasari, A.F., 2013). Airport is one of many urban transportation which causes urban noise. To clarify the discussion it would have taken the case of noise on residential areas near the airport.

Furthermore, noisy urban areas such as the airport area, highways are surrounded by a densely populated residential area (Setyowati, E & Sadwikasari, A.F., 2013). In the previous research, housing facing to airport's runway will have high intensity noise, while housing opposite toward the runway will receive less in noise

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intensity(Setyowati, E & Trilistyo, H., 2013). Eventhough model correlation between angle of orientation and noise intensity received by inhabitant has been determined, it would be better if housing equipped by absorber however. If housing are added by absorber they will much more comfortable from noise diturbance. Materials having high absorption coefficient > 0.2 are arguably as absorbers (Ermann, M, 2015). Sawdust generated by certain woods will have different properties. Meanwhile, according to *Bucur* (2006) acoustic properties of wood will be affected by noise emission characteristics of the specific wood material.

Numenclature

L	:	Noise intensity level (dB)
A	:	Amplitudo
π/ω	:	constant
α	:	Angle of orientation (°)
$\frac{\pi}{\omega}\alpha_c$	:	Phase

1. Low cost Housing near noisy Airport

The population of the world continues to increase. As a result, the number of housing is also increasing day by day. With increasing urban population in the world, the urban sprawl is not inevitable. Transportation is an area that has never deserted the consumer in the condition as described above. Intensity of transportations by land, sea and air will always increase. To clarify the discussion, so in this article is taken case studies that have been done before, which is about the noise on the housing around the airport.

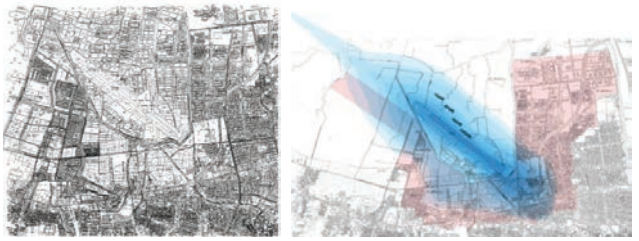

Fig.1.Noise maps in Region ofAchmadYani International Airport in Semarang, Indonesia (Setyowati, E.,2013)

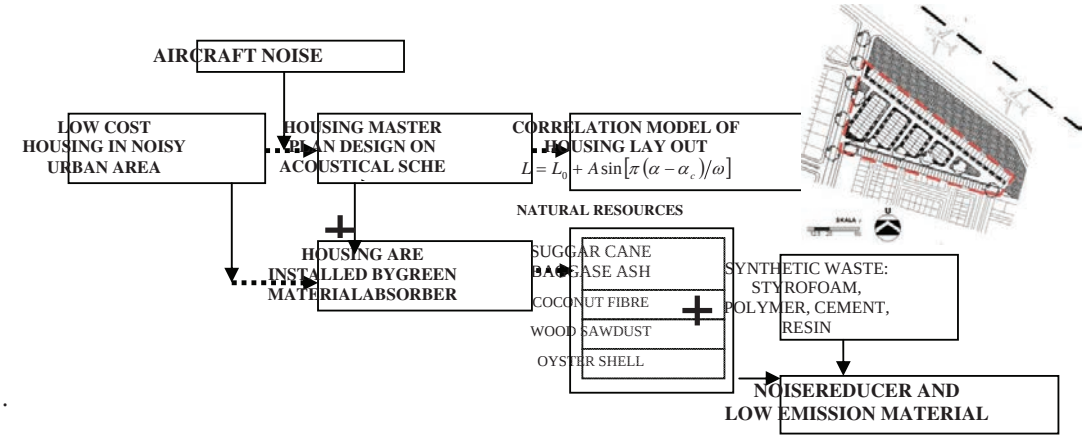

Fig.2. Low emission Comfortable Low Cost Housing in Noisy Urban Residential Space Mapping Research