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UTILIZATION OF WASTE AS A RAW MATERIAL TO REPLACE MANUFACTURED MATERIALS FOR SCAVENGERS HOUSES AT THE KAWATUNA TPA LOCATION, PALU CITY

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Abstract

The biggest problem in housing in Indonesia is how to deal with the housing problems of low-income communities. Houses normally inhabited by such communities are often in unhealthy environments, as are houses built only with cheap materials or waste materials. One example of the lower layers of the community is the drillers who settled in the Kawatuna TPA of Palu City. The drillers built houses using local materials such as wood, ruby or zinc roofs, and tripleks. The condition of the houses built by the rollers is very worrying, especially the lack of ventilation, which causes the air exchange to not take place properly. And a lot of garbage gathered in front of the house could lead to disease. This research will conduct a study that can find solutions to the problems faced by rollers in the Kawatuna TPA area, one of which is through the use of garbage waste as a substitute material manufactured for the construction of rolling houses. In addition to that, a redesign of the shape of the houses will be done to get a proper shape from the health side. The data analysis used is a qualitative descriptive analysis. Qualitative data obtained through data collection techniques using observation results in the Kawatuna TPA. The results of this study are simple, healthy home designs that utilize waste materials. The design of rolling houses is divided according to their activities: large type, or type A, for fixed rollers, and small type, or type B, for non-stable rollers.

Keywords: Waste, Replacement Raw Materials, Design Scavengers Houses, Kawatuna TPA

INTRODUCTION

The biggest challenge that must be faced in the housing sector in Indonesia is how to overcome the housing problem for low-income people (Maghfirani, Hanum, & Amani, 2022). This community needs housing with low construction costs. The houses that these people usually live in are often in unhealthy environments, and the houses are built using only cheap or used materials. The reality shows that for most poor people, the need for housing is low on the priority list after employment, food, clothing, and health. Choosing a location close to employment opportunities is also a priority, compared to where you live.

One example of the lower layers of the community is the drillers who settled in Kawatuna City, Palu. The rollers built houses using only local materials, such as wood from local trees and ruby roofs, as well as waste materials such as worn boards, worn zinc, and worn triples. Their work as rollers at the Kawatuna TPA site made them choose to build houses with merely raw materials without thinking about their shape or health.

The condition of the house built by the locator of the Kawatuna TPA is very worrying, especially the lack of ventilation in the house, which causes the air exchange in the home to not happen well. In addition, the lack of sewage facilities as well as the large amount of waste collected in front of the house can lead to the onset of disease. It is very backward in what is expressed by Frick, Heinz dan Mulyani (2006) that the house must guarantee the interests of the family, that is, to grow, to make it possible to live in communion with its neighbors, and moreover, the house should give peace, pleasure, happiness, and comfort to all the events of its life.

Based on some of the problems that have been presented earlier, considering it necessary to conduct a study that can find a solution to the problems faced by rollers in the area of TPA

Kawatuna, one of them is through the utilization of fabrication material derived from the waste waste around the settlement of the rollers of Kabatuna, where the waste will be used for building materials for the rolling house (Sherlyana, 2020). Chandra (2006) explains that the World Health Organization (WHO) defines garbage as something that is not used, unused, unfertilized, or discarded and that comes from human activities and does not occur on its own. However, based on the results of the initial survey of the research team, it was found that there are some kinds of used garbage that can be reused as a building material for the housing of Kawatuna TPA rollers. In addition to this, it will be done to redesign the shape of the housing of TPA rollers to get a decent form of housing from the health side.

Smith (2005) revealed that the use of used materials in buildings can be categorized into three criteria, namely: reuse for its original function, recycling or modification, and reprocessing. A material is said to be reused if the form and function used are the same as its original function and form. Meanwhile, recycling, modification, and reprocessing require processing before reapplication. Karyadi et al. (2014) provide a study showing that local materials can reduce the unaffordability of the poor for high-priced building materials; however, for the scavenger community at the Kawatuna TPA, Palu City, the materials that can be afforded are used materials, both building materials and materials. non-building materials such as used tires, used bottles, walls, and floors made from used boards, as well as used zinc as roofing material.

Surajana and Ardiansyah (2013) revealed that the use of recycled materials is regulated at the source and material cycle points, i.e., the reuse of old buildings and/or otherwise used materials to reduce the usage of new materials, reduce waste disposal, and extend the lifespan of materials. The measure is to reuse all used materials, whether from old buildings or elsewhere, such as main structural materials, facades, ceilings, floors, partitions, coffins, and walls, equivalent to at least 10% of the total material cost, which will add the value of the presentation of departure to source points and material cycles. In this case, designs need to pay attention to alternative design factors, which incorporate elements of old building materials into new buildings.

RESEARCH METHOD

The type of research used is descriptive research. In descriptive research, there are two groups of data: qualitative data and quantitative data. Qualitative data is described in words or sentences, while quantitative data contains numbers resulting from calculations or measurements (Arikunto S, 1998).

The data analysis method used in this study is qualitative descriptive analysis. It's done to get the analysis microscopically. Qualitative data is obtained through data collection techniques using observations in the Kawatuna TPA environment. Gulo (2002) says that observation is a method of gathering data, while researchers record information as witnessed during the study. The testimony to the event can be obtained by seeing, listening, or feeling, which is then recorded as objectively as possible. The data obtained from the results of the observations is then identified and analyzed to identify the application of any recycled material applied to the physical elements of architecture in the residential design of Kawatuna TPA rolling houses.

At this stage of the interview, it was conducted using the method of unstructured interviews with rollers who settled in the Kawatuna TPA area. It's done to identify the shape of the house or the living room of Kawatuna's TPA rollers. The results of observations are to be recorded in field records (Faisal, 1990). Micro-analysis will result in the planning of the rolling house, starting with the design of the function of the space, the shape of the building, and the material to be used.

RESULT AND DISCUSSION

Research Location

The location of this research covers the Kawatuna TPA area with research material, namely identifying and formulating house designs for scavengers at Kawatuna TPA by utilizing used goods from scavenging results.

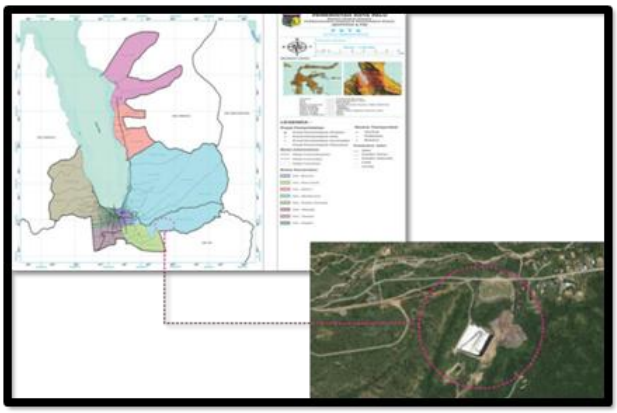

Figure 1. Map And Aerial Photo of Kawatuna Landfill Location (Source: Google Earth, 2023)

Building Design Analysis

Building design is analyzed to determine the type of house, the shape of the building, and the materials used in the building. The stages in the building planning process need to consider the locality of the surrounding area, which may affect the building design (Kamila & Prakosa, 2023). In addition, the needs and activities of the building should be taken into account for the convenience of the user. The following will outline the concept of design for building houses based on the needs of space and methods of settlement, as well as the materials used for building assembly.

Shape Of The House

The shape of the house uses the basic conceptual approach of shapes consisting of a top, a triangle, a square, and a circle. It is consistent with what Ching (2000) expressed: that the basic shapes in architecture are triangles, squares, and circles. Each of these shapes has different properties and effects.

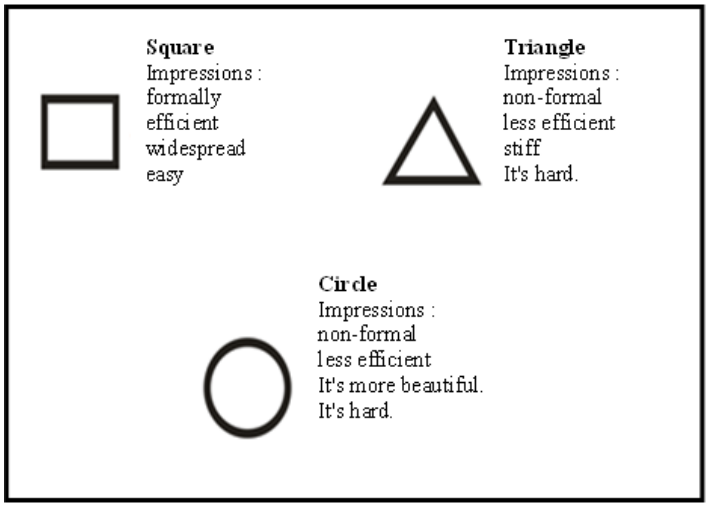

Figure 2. Basic Forms in Architecture (Source: Ching, 2000)

The properties and characteristics of some of the above basic shapes are then assessed according to the characteristics, as the basic shape for the flat houses of rollers is the fourth aspect that is more efficient and easy in the layout, can maximize the function of the space, and can help them minimize the financial expenditure in the construction (Tresnawati & Prasetyo, 2018).

Based on the shape and pattern of rolling activity, the building is built in the form of a stage house. More time is spent in rolling activities such as sorting up goods and storing goods so that the storage warehouse can be directly accessed by the user by placing a storage place under the houses.

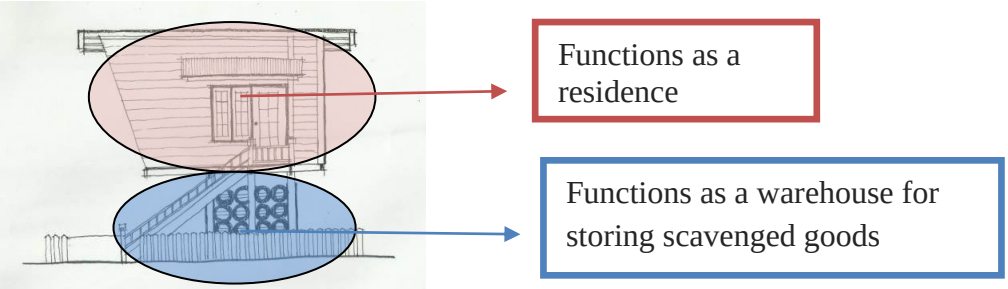

Figure 3. Placement Of Space Functions In The Scavenger House Building Design (Source: Analysis Results, 2023)

Space and Properties

Based on the activity of the perpetrators in one unit of the house, there will be several functions in the space. A place of residence and storage of goods In determining the functional layout of the room, it is necessary to pay attention to the ease of achieving it and not affect one with the other. More rolling time is spent sorting and storing goods so that the warehouse can be directly accessed by the user.

The building area of the rolling house uses two types, namely the large type, or type A, for the fixed rollers and the small type, or type B, for the non-resident rollers in the settlement. Space size calculation using the standard space size guidelines (architect data) of the first edition booklet Anggraini & Rahmi, 2019; Neufert, (1996).

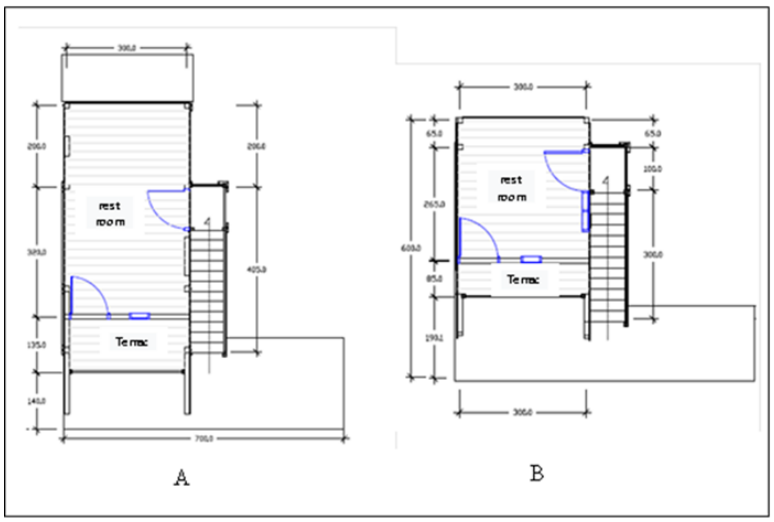

Figure 4. (A) Large Type Plan, (B) Small Type Plan (Source: Analysis Results, 2023)

Figure 5. (A) Design of a Large Type Scavenger House; (B) Design of a Small Type Scavenger House
(Source: Analysis Results, 2023)

Construction Material for The Building of a Rolling House

The analysis of building materials for housing is carried out to facilitate the selection of building materials that correspond to the characteristics and economic capabilities of the user. The types of materials that can be used are as follows:

Table 1. Recommendations for Building Materials for Scavenger Houses

Roof	Wall	Floor
• Rooftile • Zinc • Tarpaulin • Rumbia	• Used Or New Boards • Used Bottles • Tarpaulin • Used Tires • Bamboo	• Used Or New Boards

(Source: Analysis Results, 2023)

Glass bottles are arranged in rows and columns on wooden shelves that are lined with paper-waste glue. This glass bottle wall is used for the front wall. In addition to serving as a wall, it also serves as a window for natural lighting. As for the construction of tires, used tires can be used as walls for warehouses, as they can protect goods while still optimizing natural lighting and heating.

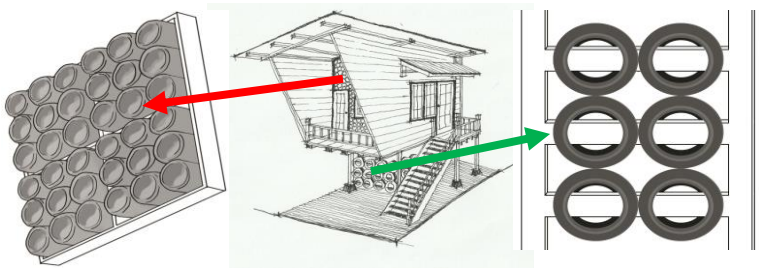

Figure 6. Wall Construction Made from Used Goods in The Scavenger House Plan
(Source: Analysis Results, 2023).

CONCLUSION

This research is aimed at conducting a study that can find a solution to the problems faced by rollers in the area of TPA Kawatuna, one of which is through the use of garbage waste as a substitute material manufactured for the construction of rolling houses. In addition to this, it

will be done to redesign the shape of the residence of the TPA Kawatuna to get a decent form of housing from the health side.

This type of research is qualitative descriptive research. The data analysis method used in this study is qualitative descriptive analysis. It's done to get the analysis microscopically. Qualitative data is obtained through data collection techniques using observations in the Kawatuna TPA environment. In addition to the observations, an unstructured interview was conducted with the drillers who settled in the Kawatuna TPA area. It's done to identify the shape of the house or the living room of the drill.

The results of this study are healthy, simple home designs that utilize used waste materials such as used tires, used bottles, new or old sink boards, and used zinc. Furthermore, the design of the rolling house is divided into three types based on its activity: the large type, or type A, for the fixed rollers, and the small type, or type B, for the non-stable rollers.

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