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TRAINING ON MAKING PAVING BLOCKS FROM CONCRETE WASTE TO IMPROVE THE ECONOMY

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ABSTRACT

This study aims to improve community skills in processing concrete waste into products with economic value, especially paving blocks, through training activities. Concrete waste which is generally considered useless and polluting the environment, is reprocessed into useful construction materials. The implementation method includes initial observation, training planning, activity implementation, and evaluation of results. Training activities are carried out with a participatory approach, involving the community directly in the process of mixing materials, molding, and drying paving blocks. The results of the study showed that this training succeeded in increasing the knowledge and skills of participants in producing paving blocks from concrete waste. In addition, participants began to see the potential for micro-businesses that could be developed from the results of this training. Economically, this activity opens up new opportunities to increase community income, especially in areas with high unemployment rates and limited access to formal employment. In conclusion, training in making paving blocks from concrete waste has proven effective as an innovative solution in waste management as well as a strategy for empowering the community's economy. It is hoped that this activity can be replicated in other areas as a sustainable effort to create a clean environment and an independent economy.

Keywords: Training, Paving Block, Concrete Waste, Community Economy, Empowerment, Recycling, Micro Business

INTRODUCTION

Training in making paving blocks from concrete waste has emerged as a promising innovative solution, offering a dual approach to addressing environmental issues and increasing the economic potential of the community (Rangkang et al., 2020) . The utilization of concrete waste, which often ends up in landfills, becomes a valuable resource through the recycling process into functional and economically valuable paving blocks (Nasution et al., 2023) . This initiative not only reduces the volume of waste that pollutes the environment, but also creates new business opportunities and improves community skills in the fields of construction and waste management (Khasanah et al., 2021) . The application of simple technology and easily available raw materials makes this training very relevant and easily adapted by various communities, especially in areas with abundant sources of concrete waste (Fadliah et al., 2021) . Infrastructure improvements, especially in the housing sector, are supported by the use of paving blocks as construction materials because they are considered cheaper and easier to work on (Dharma & Yuono, 2017) . In addition, paving blocks also have the ability to absorb water (Mudjanarko et al., 2020) .

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Concrete waste, the result of construction, renovation, or demolition activities, is often a significant environmental problem. However, behind this problem, there is great potential to recycle concrete waste into useful construction materials, one of which is paving blocks. Concrete has strong and durable physical properties, making it an ideal material for making paving blocks (Randa et al., 2023) . The process of recycling concrete waste is relatively simple, starting with the collection and sorting of concrete waste from various sources. After being sorted, the concrete waste is crushed into aggregates of the appropriate size for the paving block mixture. This recycled aggregate is then mixed with cement, water, and other additives to produce a concrete mixture that is ready to be molded into paving blocks (Julmile et al., 2023) The use of recycled aggregates from concrete waste not only reduces dependence on limited natural resources, such as sand and gravel, but also reduces the cost of producing paving blocks. In addition, paving blocks made from concrete waste have the same strength and durability, and in some cases even better, than conventional paving blocks. Utilization of plywood and sawnwood waste can also be considered for making sports equipment and preschool educational equipment (Sutadi & Suhono, 1987) .

The training on making paving blocks from concrete waste is designed to provide practical knowledge and skills to the community, so that they are able to produce high-quality paving blocks independently. The training materials cover various aspects, from the introduction of types of concrete waste and how to process them, the right material mixing techniques, to the process of molding, drying, and testing the quality of paving blocks. Training participants will also be equipped with knowledge about small business management, including calculating production costs, product marketing, and business development strategies. This training not only focuses on technical aspects, but also emphasizes the importance of occupational safety and environmentally friendly practices. By participating in this training, participants are expected to be able to create new jobs, increase family income, and contribute to sustainable local economic development. Utilization of pomelo peel waste can also be a promising business opportunity through processing into various flavors of sweets (Fadhil & Ashoer, 2019) .

The use of concrete waste as a raw material for paving blocks has a significant positive impact on the environment. First, it reduces the amount of waste disposed of in landfills, thereby extending the service life of landfills and reducing the risk of environmental pollution. Second, it reduces the need for over-exploited natural resources, such as sand and gravel, which often cause environmental damage. Third, it reduces greenhouse gas emissions resulting from cement production, because some of the cement is replaced by recycled aggregates. Fourth, it reduces the cost of transporting waste to landfills and raw materials to paving block factories, thereby reducing fuel consumption and carbon emissions. Thus, training in making paving blocks from concrete waste is a strategic step to create a cleaner, healthier, and more sustainable environment. Good and proper waste management can also protect the environment (Nasrudin et al., 2020) . Local governments have an obligation to carry out environmental control (Putra & Mubarak, 2020) .

The success of the paving block making training program from concrete waste is highly dependent on the right implementation and development strategies. First, establish cooperation with various related parties, such as local governments, construction companies, civil society organizations, and educational institutions, to obtain the support and resources needed. Second,

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conduct socialization and promotion of the training program widely to the community, especially vulnerable groups who need jobs. Third, provide adequate training facilities and equipment, as well as competent and experienced trainers. Fourth, develop a training curriculum that is relevant to market needs and technological developments. Fifth, provide assistance and mentoring to training participants after completing the training, so that they can start and develop a successful paving block business. In addition, it is important to continue to evaluate and improve the training program, so that it is more effective and efficient in achieving the expected goals. Training and counseling programs involve participants (Nasrudin et al., 2020) .

The construction sector plays a significant role in economic growth and improving people's quality of life (Zamarki et al., 2020) . However, this sector is also one of the largest contributors of waste in the world. Construction waste, including concrete waste, is often dumped into landfills without being processed first, causing serious environmental problems. The theory of the circular economy offers a solution to overcome this problem, by encouraging the reuse of waste as a valuable resource. In this context, training in making paving blocks from concrete waste is a real implementation of the principles of the circular economy. The use of concrete waste as a raw material for paving blocks not only reduces the negative impact on the environment but also creates new economic value and improves people's welfare. The concept of lean manufacturing can be applied to minimize waste in the production process and increase the efficiency of resource use (Khasanah et al., 2021) . The government continues to increase infrastructure development.

A Worker is Showing The Concrete

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Despite its great potential, the implementation of the training program for making paving blocks from concrete waste also faces various challenges. One of them is the lack of public awareness and interest in the use of concrete waste. To overcome this challenge, intensive socialization and education efforts are needed for the community, as well as providing incentives and support for those interested in participating in the training. Another challenge is the non-uniform quality of concrete waste and the limited availability of concrete waste. To overcome this challenge, strict quality control of concrete waste is needed, as well as establishing cooperation with construction companies and building managers to ensure a sustainable supply of concrete waste. In addition, research and development are also needed to improve the quality and variety of paving block products from concrete waste, so that they are increasingly in demand by the market. Enforcement of penalties for violators of environmental policies can maximize policy implementation (SUPRAYITNO et al., 2025) .

Paving blocks from concrete waste have great economic potential and market opportunities in Indonesia. The demand for paving blocks continues to increase along with the growth of the construction and infrastructure sectors. Paving blocks from concrete waste offer a cheaper and more environmentally friendly alternative compared to conventional paving blocks. In addition, paving blocks from concrete waste also have advantages in terms of strength, durability, and aesthetics. The government is also increasingly encouraging the use of environmentally friendly products in development projects, thus opening up greater market opportunities for paving blocks from concrete waste. Thus, training in making paving blocks from concrete waste can be a solution to increase people's income and create new jobs. Utilizing waste into products with economic value can increase people's original income (Fadhil & Ashoer, 2019) .

RESEARCH METHODOLOGY

The research methodology used in this concrete waste paving block making training program involves quantitative and qualitative approaches. The quantitative approach is used to measure the effectiveness of the training in improving participants' knowledge, skills, and income. Data were collected through pre-tests and post-tests, as well as surveys and interviews. The qualitative approach was used to understand participants' experiences and perceptions of the training, and to identify factors that influence the success of the program. Data were collected through participant observation, in-depth interviews, and focus group discussions. Quantitative data were analyzed statistically using descriptive and inferential methods, while qualitative data were analyzed thematically using the content analysis method. Evaluation of program implementation needs to be carried out (Agus et al., 2020) .

RESULTS AND DISCUSSION

Economic Feasibility Analysis

Economic aspects are crucial factors in determining the sustainability of a training program. Economic feasibility analysis is conducted to evaluate the potential financial benefits that can be obtained from the activity of making paving blocks from concrete waste. The parameters analyzed include initial investment costs, operational costs, potential income, and estimated profits. Initial investment costs include the purchase of production equipment, training costs, and licensing costs. Operational costs include raw material costs (concrete waste), labor costs,

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marketing costs, and equipment maintenance costs. Potential income is calculated based on the estimated production volume and selling price of paving blocks. Estimated profit is calculated as the difference between income and costs. The results of the economic feasibility analysis indicate that the activity of making paving blocks from concrete waste has a fairly high profit potential, with an attractive rate of return on investment and a relatively short payback period.

In addition to the economic aspect, the training program for making paving blocks from concrete waste also has significant social and environmental impacts. Positive social impacts include improving community skills and knowledge, increasing income and welfare, and creating new jobs. Community training and empowerment programs can help improve community capabilities (Ridolla & Kasmiati, 2023) . Positive environmental impacts include reducing the volume of concrete waste disposed of in landfills, reducing the use of natural raw materials such as sand and cement, and reducing greenhouse gas emissions. Utilizing plastic waste into various recycled creations can provide benefits (Fikri et al., 2022) . Thus, this training program contributes to the achievement of sustainable development goals, especially goals related to the environment and community welfare (Hendrati & Fitrianto, 2020) .

Success Factors and Challenges

Identifying factors that influence the success and challenges in implementing training programs is essential to ensure the effectiveness and sustainability of the program. Success factors include support from the government and private sector, active participation from the community, availability of adequate raw materials, good quality training, and effective management. Challenges faced include lack of public awareness and interest, inconsistent quality of concrete waste, tight market competition, and limited capital (SUPRAYITNO et al., 2025) (Nasrudin et al., 2020) (Irawati et al., 2025) (Kurniawan, 2020) . To overcome these challenges, intensive socialization and education efforts are needed for the community, as well as providing incentives and support for those interested in participating in training (Sembalun Bumbung Adalah Sebuah Desa Yang Lokasi Di Kaki Gunung Rinjani, nd) . Leadership training provides the ability to overcome challenges in public service (Ahadiyati Kartikaningsih et al., 2025) . In addition, it is also necessary to carry out strict quality control of concrete waste, as well as establish cooperation with construction companies and building managers to ensure a sustainable supply of concrete waste.

CONCLUSION

The training program for making paving blocks from concrete waste is an innovative and sustainable solution to overcome the problem of construction waste and improve the community's economy (Hidayati et al., 2023) . With the right implementation and development strategies, this program can make a significant contribution to achieving sustainable development goals (Ahadiyati Kartikaningsih et al., 2025) .

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