

INTERNATIONAL COURSE OF ONE ASIA COMMUNITY IN 2019 "TONGBU FOR ECOBRICK"

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Abstract. Reduction in the use and processing of plastic waste is a big problem in Indonesia. Piles of plastic waste mixed with organic waste into a source of disease. Because of the decomposition of the plastic waste is very long, plastic described in 1 millennium or about 1000 negative tahun. The negative nature of the plastic can be used to make a durable ecobrick. Ecobrick resistant plastic waste recycling solutions by introducing and compacting waste plastic into bottles, the result will be used as a substitute batubata. Great ecobrick the standard minimum size ecobrick 1500ml bottle must have a minimum weight of 500gram and 600ml size bottles must have a minimum weight of 200gram. 0.33g / ml is the minimum density ecobrick nice and 0.7 g / ml maximum. Minimum weight = Volume of bottle x 0.33. To test the density, we can squeeze the bottle from the outside. Ecobrick good is when the bottle will not be flat and not make a sound when pressed down. To make good ecobrick bottle and weighed according to the standard it used tongbu (bamboo stick). Tongbu (bamboo sticks) is made of a series of bamboo with a knife. The type of bamboo used bamboo Tamiang and bamboo irateun because having a diameter corresponding to the width of the bottle, which is about 2-4 cm. In addition, because bamboo is a natural resource that can be refurbished and are organic so it will decompose properly in nature. By using the process of cutting out junk tongbu manually can be done automatically, just by entering the garbage into the bamboo tube of plastic waste will be cut by a knife that is on the tip of the bamboo automatically. Furthermore garbage that has been cut will be solidified by the end of the bamboo that has been made to resemble the shape of an umbrella. This is so that pressure can be evenly distributed throughout the cross-section of the bottle and trash compacted perfectly. The purpose of using tongbu (bamboo sticks) to make it easier and save time in the manufacturing process, resulting in a bottle ecobrick accordance with the standards and personal awareness to be responsible for the trash self. So spirit for processing plastic waste is maintained.

Keyword: plastic waste, tongbu, ecobrick.

I. INTRODUCTION

Plastic waste has become a normal thing that is often found in the environment. However, to overcome it becomes very remarkable. According to the Director General of the management of waste, waste, and B3 (Material to be harmful and toxic) of the Ministry of Environment and Forestry, Tuti Hendrawati Mintarsih, refer to the total amount of garbage Indonesia in 2019 will reach 68 million tons, and plastic waste is expected to reach 9.52 million tons, or 14 percent of the total garbage. Based on data from Jambeck Jenna, a garbage researcher from the University of Georgia, Indonesia is ranked second world producer of plastic waste which reached 187.2 million tonnes, after China, which reached 262.9 million tons. Not to mention, the use of plastics in Indonesia is a waste which is the main source of weight accumulation of garbage, especially plastics described in 1 millennium or about 1000 years. Not again,

From these data we can see that waste is a serious problem. There are several steps that have been taken by the government to tackle this waste one is to utilize thermal technology to destroy rubbish. However, this method has not been evenly distributed in Indonesia. New Peralisasiannya in PLTSa Bantargebang, Bekasi, Jawa Barat.

Culling of garbage by burning is not the best solution because it will produce toxic combustion gases. Plastic is made from petrochemical substances. These chemical substances are not worth returning to the ecology around us. Scientific studies show that these chemicals are toxic to humans - we know when the smell of burning plastic. In the end, plastic scattered, burned or thrown away substances break down into toxic chemicals.

As a society we have to help the government in solving this problem. Thus, the principle of the 3Rs ie Reduce (reducing), Reuse (Reuse), and Recycle (recycling) should be applied in addressing waste plastic, with a simple but effective way, namely Ecobrick.

This method is proven to reduce the amount of plastic waste in Canada, the country's shelter Ecobrick creator, namely Russell Maier. He is an artist who works in Indonesia ecobrick its complete projects. He found the idea ecobrick time to think about what the best solution to overcome the problem of plastic pollution in the world. The discovery took place while he was in a village in the valley of Sagada, Philippines.

To make ecobrick there are three steps to do that is to make sure the trash is dry and clean, cut the waste into smaller parts and then insert and compacting trash into the bottle. But in the making had been uncovered. To make the process of cutting and inserting garbage takes a long time and it was less efficient that can reduce the spirit to make ecobrick. Also according to Customs an environmental activist who is now the chairman of the bank Plastavfall, he said many bottles Ecobrick made not in accordance with the standards ecobrick. So it can not be utilized as a brick, but back into the trash.

Of those constraints I provide solutions for use Tongbu (bamboo stick) to manufacture Ecobrick. This tool will help cut and compacting trash automatically in the bottle. So that it can streamline the time and generate a solid ecobrick perfect bottle. So far the tool tongbu (bamboo stick) have never been there, usually manufacture ecobrick only use wood for compacting trash bins and cut manually.

Thus, this tool is made with the purpose of providing a solution for easier and faster in making ecobrick, with the ease of self-consciousness is expected to grow to be responsible for their own garbage, especially plastic waste.

II. BASIC THEORY

Plastic is not biodegradable, but by photons (electromagnetic particles). That is, the plastic is left for years in soil or water will slowly break down into smaller chunks. In the end it becomes very small fragments to be absorbed by plants, fish, and animals we consume.

Scientists also found the terrible impact of the chemicals that make up the plastic on the human body. Chemicals like biphenyl A and Phthalate now banned in certain products in the US and Europe. A small number of these chemicals may have adverse effects on humans - from causing allergies, hormonal imbalances, to cancer and acute poisoning. Children are most vulnerable.

Nature works in cycles. That is why nature does not provide holes or landfills! Everything is recycled. Humans can learn from nature and replacing straight lines with circles. Let's start with Ecobricks. "Eco" and "brick" mean environmentally friendly bricks. Called the "brick" because it can be an alternative to conventional brick in the building. Therefore ecobrick commonly used as raw material for making furniture. Ecobrick is a solid plastic bottle filled with non-biological waste to make building blocks that can be reused. Eco-bricks are technology-based collaboration solution that provides solid waste at no cost to individuals, households, schools, and communities. Also known as the Bottle Brick or Ecoladrillo. Local waste solution is started to be called Ecobrick by a growing movement of people across the world. We can change into a plastic benefit the community and local ecosystems. Characteristics of highly problematic plastic used is longevity and durability even become something sought. Negative of nature can be harnessed to produce something positive.

The steps to create ecobrick namely:

1. Collect, separate, wash, prepare all types of plastics to create ecobrick.
2. Select the brand and size of the same bottle. Having ecobrick in the same bottle congruent simplify and beautify the results.
3. Use a wooden stick to tamp. Avoid iron, glass, which will damage the bottle. Avoid paper and food scraps that would decompose. But, sticks will be replaced with Tongbu (bamboo sticks) to make the process more efficient.
4. Enter soft colored plastic for the base of the bottle to make ecobrick be colored building construction

It is important to ensure the quality ecobrick. Ecobrick minimum size 1500ml bottle must have a minimum weight of 500gram and 600ml size bottles must have a minimum weight of 200gram. 0.33 g / ml is the minimum density ecobrick nice and 0.7 g / ml maximum. Minimum weight = Volume of bottle x 0.33. To test the density, we can squeeze the bottle from the outside. Ecobrick good is when the bottle will not be flat and not make a sound when pressed.

To make bottles ecobrick appropriate standards as described above. Then the solution offered by the use tongbu (bamboo stick) for cutting and compacting trash that filled

into bottles. Tongbu (bamboo sticks) is made of a series of bamboo with a knife.

Bamboo is a plant species of grasses with a cavity and vertebra in the trunk. Bamboo has many types. Another name of bamboo is a reed, aur, and pine. In this world, bamboo is one of the fastest growing plants. Because it has a rhizome-dependent system is unique, in a day of bamboo can grow along the 60cm (24 inch) even more, depending on the soil conditions and climatology where it is grown.

The type of bamboo used bamboo and bamboo irateun Tamiang because having a diameter corresponding to the diameter of the bottle, which is about 2-4 cm. In addition, because bamboo is a natural resource that can be refurbished and are organic so it will decompose properly in alam. Harga bamboo's also a reason for choosing tongbu material made of bamboo. Bamboo at a height of 10 m and diameter of 2-4 cm, dark green, from Indonesia spread to Peninsular Malaysia, Cambodia, and Vietnam, are used as material for the flute, rod, and handicrafts.

The process of cutting and compacting trash will be done automatically using tongbu saving time in the process and also will produce the dense ecobrick bottle according to the standard.

III. DISCUSSION

Ecobrick manufacture menggunakan Tongbu will facilitate the process of making and ecobrick produced will be perfect.

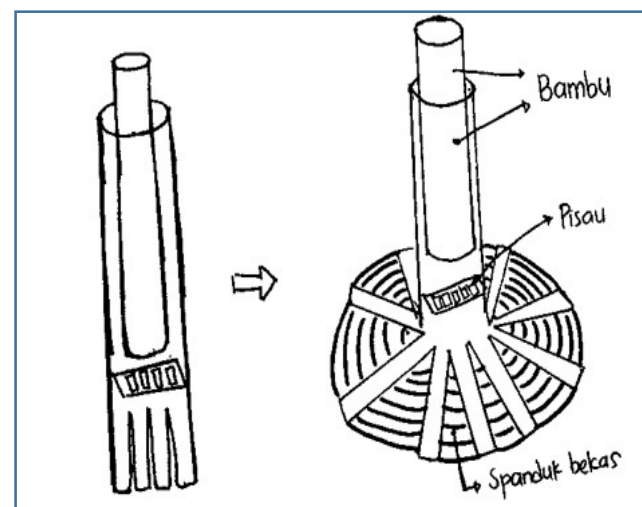


Figure 1: Design Tongbu (bamboo sticks)

How to make a very simple Tongbu. Provide tools and materials.

Material :

1. bamboo
2. razor blade
3. former banner.

tool:

1. wood glue,
2. knife
3. scissor.

Step works:

1. Search bamboo that match the criteria.

A. Choosing Bamboo

The first step is to choose the appropriate size with a diameter bamboo straws to be made. Usually if planted at a specified time, will get the desired size when going to cut it down.

B. Drying in the Sun

After the bamboo ready to be selected, on-treatment with the sun heating methods. The process to remove moisture contained therein. When the bamboo began to dry up, the trunk will contract and shrink. This shrinkage process started since bamboo is cut down, and can reduce the diameter of the bamboo up to 16% and reduce its thickness by 17%.

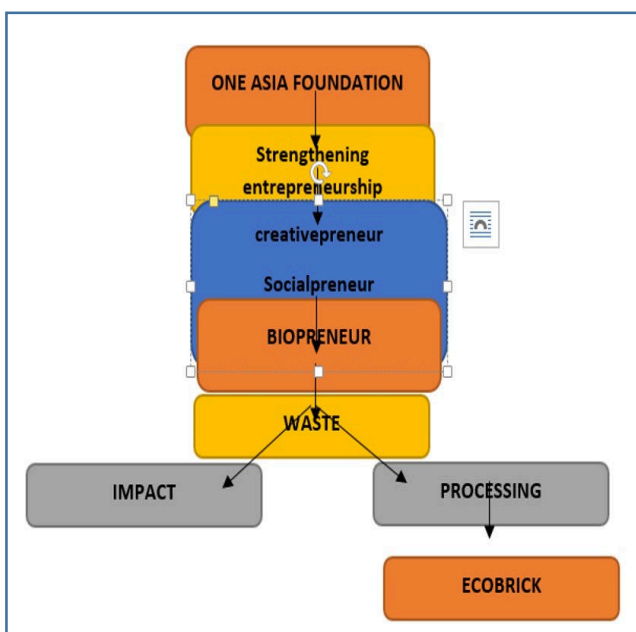
C. Cleaning process

Bamboo to be processed, cut to the size specified height. Thereafter, the entire surface must pass through the stage of refinement that is rubbed sandpaper. Furthermore, bamboo washing with water and dried with the aid of sunlight.

1. Bamboo that had been cleaned with a high dipotong. Sesuaikan bamboo size bottle
2. Provide two bamboo, one of the outer tube and one for suppression.
3. For the outer tube, the bottom in the split into several parts. This is so that bamboo can expand.
4. Then sidelines parts of bamboo, attach a banner ex. Banners former serves as a cover bamboo expanding cross-section. And serves to compact the garbage in the bottle.
5. Inside the outer tube stick a razor blade using wood glue. Serves to cut trash.

By using Tongbu the process of cutting out junk manually can be done automatically, just by entering the garbage into the bamboo tube of plastic waste will be cut by a knife that is on the tip of the bamboo automatically. Furthermore garbage that has been cut will be solidified by the end of the bamboo that has been made to resemble the shape of an umbrella. This is so that pressure can be evenly distributed throughout the cross-section of the bottle and trash compacted perfectly.

Figure 2. Mind Map



IV. CONCLUSION

Garbage waste management is a shared responsibility. Selecting processing plastic waste into ecobrick is a good solution. But in making ecobrick common obstacles, such as a long manufacturing process, because the plastic waste should be cut into small pieces so that the solid ecobrick perfect bottle. If not perfect solid or does not comply with weight standards Ecobrick bottle, then the bottle ecobrick will not be able to be used as a substitute for bricks, but will go back into the trash in the neighborhood. So that it does not happen, is used tongbu as a solution to facilitate and streamline time in making ecobrick to produce bottles ecobrick accordance with the standards, and personal awareness to be responsible for the own garbage. So spirit for processing plastic waste is maintained. Together we can build a green area that will enrich the environment and society. Reduce consumption and avoid plastic as much as maybe use materials that decompose organic.

REFERENCES

Bea.(2019, april 27). Personal Interview.

Imronin, Maurilla. 2018. *Ecobricks* di <https://zerowaste.id/waste/ecobricks/> (access 18 may 2019)

Nd, Hanifah. 2019. 5 Fakta Ecobrick yang Wajib Kamu Tahu, Bisa untuk Bikin Rumah! Di <https://www.idntimes.com/life/diy/hanifah-yoshioka/fakta-ecobrick-c1c2/full>(access 18 may 2019)

Putra, Aditya. 2018. Ecobrick, Karya Artistik Limbah Plastik di <https://catatanalam.wordpress.com/2018/09/22/ecobrick-karya-artistik-limbah-plastik/> (access 18 may 2019)

file:///D:/Essay%20ONE%20ASIA%20FOUNDATION/Ecobrick/Panduan-Konstruksi-EcoBrick-1.0-Ind-NL050117.pdf

file:///D:/Essay%20ONE%20ASIA%20FOUNDATION/Ecobrick/Plastik-Lingkungan-dan-Ecobricks-v4.0.1.pdf

file:///D:/Essay%20ONE%20ASIA%20FOUNDATION/Ecobrick/Panduan%20Visi%20Ecobrick%20v3.2.pd