POROUS ECO-PAVING AS A LIQUID WASTE FILTER

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BACKGROUND :
Paving blocks are materials for covering the soil layer on roads and parks. The advantage of paving blocks is that they can transmit surface water into the soil, are easy to make and install on the ground surface, have a variety of shapes, are easy to maintain and are cheap. Paving blocks consist of binding materials, namely cement, water and filler in the form of sand. Other materials can be added to get the special properties of the paving. Various efforts are made to utilize the waste around us to be used as a substitute material for cement and sand substitutes. In addition, the use of local resources can be in the form of the utilization of garbage and waste that supports government programs in developing the concept of green construction in the construction world, because water absorption when using paving blocks can maintain the balance of groundwater (Adibroto, 2014).
Previous research on eco-paving materials has been carried out. One of them is that the use of plastic as a substitute for cement can reduce the cost of paving block production. The use of sea sand mixed with plastic waste can increase the durability of paving blocks. The quality of paving blocks that can be produced using sea sand is grade C based on the SNI 03-0691-1996 standard (Bahri et al., 2021).
METHOD : The research method in this study is an experimental laboratory. The first stage is washing and drying the gravel aggregate, then continued with the process of frying rice husks. The next stage is the weighing of aggregates and classification by type. The last stage is to carry out the design mix process with each aggregate with adhesive material. The design mix consists of components that are arranged vertically consisting of 8 meshes of gravel material (1) which are arranged at the very bottom and followed by rice husks (2) at the bottom, then continued with the preparation of carbon charcoal (3) on the top layer of rice husks and quartz sand (4) which is arranged at the top after carbon charcoal and glued to each component part with Portland cement or fly ash.
RESULTS & DISCUSSION: The composition of Porous Eco-Paving includes the first layer of 8 mesh gravel weighing 1240 gr, the second layer of rice husk weighing 144 gr, while the third layer of carbon charcoal weighing 670 gr, and the fourth layer of quartz sand 1395 gr. The additional mixture in each layer is water with 230 ml for a mixture of gravel and carbon charcoal, while water with 240 ml for a mixture of quartz sand and rice husks. So that it produces Porous Eco-Paving with a size of 20 cm long, 16 cm high and 8 cm wide. The composition of the Porous Eco-Paving design mix applies to cement and fly ash adhesives.

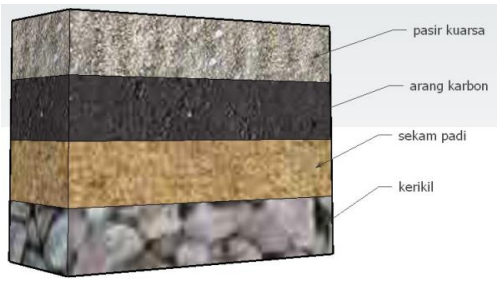

Figure 1 : Aggregate Briquette Constituents (Source: Primary Data, 2022)

With the Porous Eco-Paving dimensional design, length = 56 cm, width = 27 cm, and height = 16 cm, a volume of 0.025 m3 is obtained. Based on the relationship between the width and depth of the flow in the best hydraulic cross-section, the rectangular shape obtained a filling time of 10.41 seconds or 96.061 m3/s with a seepage time of 5.942 sec or 0.00058 m3/s so that the total filling is 0.013928845 m3s with an Eco-Paving thickness of 8cm. As a result of the calculation from the information above, it can be concluded that the fly ash adhesive takes longer to harden with a 7 x 24 hour Porous Eco-Paving drying time to obtain strong adhesion so that it can function properly.
The results of the laboratory test were obtained from the wastewater reduction process with TSS 14 cement adhesive, pH 7.1, COD 6.04, BOD 2.88, Oil and Fat 2.7 and Total Coliform 1,200 while with fly ash adhesive TSS 46, pH 8.15, COD 110.07, BOD 60.38, Oil and Fat 8.5 and Total Coliform 3,500. From the results of the laboratory test of Porous Eco-Paving for wastewater treatment, the selection of Porous Eco-Paving with cement adhesive is very effective to be used as a wastewater treatment medium.

CONCLUSION : Based on the results of the process of making Porous Eco-Paving with each aggregate and adhesive material of cement and fly ash, Porous Eco-Paving is produced as domestic wastewater treatment with a height of 16 cm, a width of 8 cm and a length of 20 cm.
A series of components arranged vertically with dimensions of length = 56 cm, width = 27 cm, and height = 16 cm, then a volume of 0.025 m3 is obtained. Based on the relationship between the width and depth of the flow at the best hydraulic cross-section of the rectangular shape, the filling time of Porous Eco-Paving was obtained of 10.41 seconds or 96.061 m3/s with a seepage time of 27.201 s or 0.00016 m3/s so that the total filling of Porous Eco-Paving was 0.0142938768 m3s with a thickness of 8cm Porous Eco-Paving. From the results of the above calculations and based on the infiltration and permeability testing of Eco-Paving domestic liquid waste treatment with cement adhesives, it can be concluded that cement adhesives are easier to harden with an Eco-Paving drying time of 1 x 24 hours.

KEYWORDS : The Composision of Mix Desain, Porous Eco-Paving, Liquid Waste Filter.