International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development (IJCSEIERD)
ISSN(P): 2249-6866; ISSN(E): 2249-7978
Vol. 6, Issue 1, Feb 2016, 51-60

TRANS STELLAR
•Journal Publications •Research Consultancy

Original Article

ENVIRONMENTAL HARMONY-TYPE PAVEMENT BLOCKS MADE FROM CLAY AND WASTE GFRP

HIROYUKI KINOSHITA[1], TOSHIFUMI YUJI[2], YUSUKE YASUDA[3]
YOSHIMI OKAMURA[4], KENTARO YASUI[5] & MITSUHIRO SEZAKI[6]

[1,5]*Faculty of Engineering, University of Miyazaki, Miyazaki, Japan*

[2,4]*Faculty of Education and Culture, University of Miyazaki, Miyazaki, Japan*

[3,6]*Interdisciplinary Graduate School of Agriculture and Engineering, University of Miyazaki, Miyazaki, Japan*

ABSTRACT

To recycle glass fiber reinforced plastic (GFRP) discarded as industrial waste, we have proposed a process that produces porous glass fiber-reinforced ceramics by mixing clay and crushed GFRP before the mixture is fired. In this study, we aimed at developing environmentally friendly pavement blocks that could decrease the heat island phenomenon, prevent the inundation of roads caused by sudden heavy rain and decrease air pollution in urban areas by focusing on recent environmental issues. First, various ceramics were developed by changing the mixing ratio of clay and crushed GFRP, and their fundamental properties such as densities, porosities, pore size distributions, water absorptions and bending strength were examined. The results indicated that a porous pavement block with a high permeability and water absorption capacity could be produced by utilizing ceramics made from clay and waste GFRP. Next, the temperature changes caused when ceramic and mortar samples were irradiated with infrared light were measured. The results indicated that the ceramic had the ability to reduce radiant heat through evaporation. Finally, the NO_2 gas adsorption performance of the ceramics made from clay and GFRP was compared with those of various other materials, such as metals, plastics, wood, mortar and ceramic made from clay alone. The results also indicated that ceramics made from clay and GFRP had a high NO_2 gas adsorption ability. It is anticipated that ceramics made from clay and waste GFRP could be used as a material for pavement blocks that act as a countermeasure to the heat island phenomenon, sudden heavy rain and air pollution

KEYWORDS: Waste GFRP, Recycling, Pavement Block, Radiant Heat, NO_2 Adsorption

Received: Jan 15, 2016; **Accepted:** Jan 28, 2016; **Published:** Feb 02, 2016; **Paper Id.:** IJCSEIERDFEB20165