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Basalt Fiber-Reinforced Controlled Low-Strength Material Under Cyclic Loading

Dong Geon Son[1)], Jong-Sub Lee[2)], Seungjun Kim[3)], Myeong-Ho Bae[4)] and Yong-Hoon Byun*[5)]

[1), 2), 3)] *School of Civil, Environmental Architectural Engineering, Korea University, Seoul, Republic of Korea*
[4)] *Kyeongdo Engineering Co., Ltd., Seoul, Republic of Korea*
[5)] *Department of Agricultural Civil Engineering, Kyungpook National University, Daegu, Republic of Korea*
* yhbyun@knu.ac.kr

ABSTRACT

Permanent deformation is a critical indicator in the base and subbase layers of pavements (Maghool et al., 2022). This study examines the permanent deformation characteristics of basalt fiber-reinforced Controlled Low Strength Material (CLSM) under cyclic axial loading. Two types of basalt fibers with different lengths are incorporated into the CLSM and cured for 3 and 28 days. Using repeated triaxial compression tests, three levels of deviator stress are applied according to the curing periods under uniform confining stress. Permanent deformation accumulation at each stress level is measured up to 10,000 cycles. Regression analysis is performed on the accumulated permanent deformation to establish a predictive model and evaluate the regression parameters. Experimental results reveal that the permanent deformation accumulation varies depending on factors such as curing periods, deviator stress, and the lengths of basalt fibers in the reinforced CLSM. The regression model predicts the permanent deformation accurately and shows variation in the regression coefficients according to the fiber lengths in the CLSM. Consequently, this study clarifies the permanent deformation characteristics of CLSM with incorporated basalt fibers, classifying the permanent deformation accumulation of each specimen using shakedown theory.

REFERENCES

[1)] Ph. D. Student
[2)] Professor
[3)] Associate Professor
[4)] Chief Executive Officer
[5)] Associate Professor

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