The 2023 World Congress on
Advances in Structural Engineering and Mechanics (ASEM23)
GECE, Seoul, Korea, August 16-18, 2023

Improvement of concrete crack image detection and measurement method using checkerboard pattern

*Harim Kim[1)], Taehoon Kim[12)] and Hunhee Cho[3)]

[1),3)] *School of Civil, Environmental and Architectural Engineering, Korea University, Seoul 02841, Korea*
[2)] *School of Architectural Engineering, Seoul National University of Science and Technology, Seoul 01811, Korea*
[1)] harusari@korea.ac.kr

ABSTRACT

Conventional methods of investigating damage to concrete facilities were generally carried out by measuring the width and length of concrete cracks using measurement tools. However, the conventional crack inspection method affects the quality of detection depending on the proficiency and subjectivity of the individual performing the measurement. Therefore, research has recently been conducted to ensure the accuracy and objectivity of crack inspection by measuring the width or length of cracks through image processing-based crack detection methods. Crack detection based on image processing technology can improve accuracy by estimating camera internal parameters such as camera's skill or focal length, camera external parameters such as angle, position, and focal length from which image data are collected, and correcting image data. In this work, we present a method of attaching a checkerboard pattern to the cracked concrete wall surface and estimating the camera interior and exterior parameters through camera calibration. The parameters obtained through camera calibration make it possible to correct the distortion of the plane according to the camera position through homography transformation. The method presented in this study is expected to contribute to improving image data-based crack detection and measurement accuracy by estimating camera parameters of crack image data taken at various angles and locations according to complex construction site conditions.

[1)] Ph.D. candidate
[2),3)] Professor