Development of structural health monitoring and early warning system for reinforced concrete system

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ABSTRACT

Many buildings have been damaged due to earthquakes that occurred recently in Indonesia. The main cause of the damage is the large deformation of the building structural component cannot accommodate properly. Therefore, it is necessary to develop the Structural Health Monitoring System (SHMS) to measure precisely the deformation of the building structural component in the real time conditions. This paper presents the development of SHMS for reinforced concrete structural system. This monitoring system is based on deformation component such as strain of reinforcement bar, concrete strain, and displacement of reinforced concrete component. Since the deformation component has exceeded the limit value, the warning message can be sent to the building occupies. This warning message has also can be performed as early warning system of the reinforced concrete structural system. The warning message can also be sent via Short Message Service (SMS) through the Global System for Mobile Communications (GSM) network. Hence, the SHMS should be integrated with internet modem to connect with GSM network. Additionally, the SHMS program is verified with experimental study of simply supported reinforced concrete beam. Verification results show that the SHMS has good agreement with experimental results.

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