

ABSTRACT

Cracks in brick structures can significantly affect the strength and stability of buildings. Early detection of these cracks is crucial to prevent further damage and ensure building safety. In this study, an antenna is utilized as a sensor to detect cracks in bricks. The antenna is designed and implemented using electromagnetic wave technology capable of detecting changes on the material's surface. This research is expected to meet the standardization values of IEEE, which regulates the definitions and terminology related to antennas. The specifications of this antenna were also obtained from several journals about antennas as a detector.

The research involves several stages, including the design and fabrication of the antenna, laboratory testing, and data analysis. The antenna used is a microstrip type operating at a frequency of 2.5 GHz. This frequency was chosen because it follows the standardization of the antenna as a sensor. Testing is conducted by creating artificial cracks in the bricks and measuring the changes in the signal generated by the antenna. The research results indicate that the antenna is capable of detecting cracks effectively. The signal received by the antenna shows significant changes when there are cracks in the bricks.

Testing was conducted on two different brick samples with various crack variations. The antenna successfully detected the presence of cracks in both types of bricks.

Therefore, using an antenna as a sensor for detecting cracks in bricks can be an effective and efficient solution for monitoring building conditions. This method not only provides reasonably accurate results but is also easy to implement and economical.

This research is expected to contribute to the fields of civil engineering and electrical engineering, as well as serve as a foundation for the development of more advanced structural damage detection systems in the future.

Keywords: antenna, sensor, crack detection, bricks, electromagnetic waves