

ABSTRACT

Indonesia is an archipelagic country with diverse topography. This diversity often leads to natural disasters such as landslides, particularly in areas near railway crossings. These unpredictable landslides can disrupt transportation systems, cause accidents, and even lead to loss of life. The limited availability of landslide monitoring systems presents a challenge in developing disaster detection and mitigation in areas prone to landslides.

This challenge prompted research to develop an OTDR-based landslide monitoring system integrated with an ESP32-CAM and a LoRa communication system for data transmission. The system utilizes fiber optic cables buried underground in landslide-prone areas around railway crossings to detect landslides. The data is then processed and transmitted in real time to an IoT platform to support remote monitoring.

Test results demonstrate that the developed system is capable of detecting landslides with reasonable accuracy and responsiveness, depending on the conditions of the communication network used. Device integration enhances disaster detection and mitigation capabilities while also enabling efficient operational continuity in remote areas. Therefore, the proposed solution is effective in supporting railway operational safety in Indonesia.

Key words : Indonesia, railway, landslide.