**Collapse Accident Site Investigation using Terrestrial LiDAR Surveying**

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***ABSTRACT***

A collapse incident is one of the representative disaster accidents. Collapses can occur due to internal defects during the design phase, but other collapses are caused by natural disasters such as typhoons or heavy rainfall, as many structures are exposed to the environment. Therefore, continuous inspections of structures are crucial. Additionally investigating the causes and damages of already occurred collapse accidents is necessary for preventing recurrence and post-management. However, dealing with and investigating collapse sites is challenging due to the risk of additional collapses.

To overcome these challenges, utilizing terrestrial LiDAR is suitable for conducting on-site investigations in secured locations. This study suggests the approach of using terrestrial LiDAR for collapse site investigations. Obtained scan data for the entire collapse site of Jeongja Bridge, which occurred on April 5, 2024, using terrestrial LiDAR. LiDAR measurements were performed at 13 locations to acquire data for the upper and side portions of the bridge. The acquired data was integrated to construct a single point cloud through registration. Additionally, mesh modeling was performed to create a model of the bridge. Using the generated bridge model, the slope of the upper part of the bridge was analyzed to visually identify the area where the bridge had sagged. Furthermore, the end length of the bridge model was measured, and cross-sections of the piers and abutments were extracted for a comparative analysis with design drawings, confirming the displacement of each part of the bridge. Therefore, through the 3D model constructed using terrestrial LiDAR, conducted visual inspection and surveying of the collapsed bridge without moving in the collapse site.

In this study, confirmed the potential of using high-density terrestrial LiDAR in large-scale and high-risk structure collapse sites. It serves as a preliminary study for efficiently conducting investigations in challenging real collapsed sites.

**Keywords:** Terrestrial LiDAR, Collapse accident, Disaster investigation