D9   An Investigation of Large-Scale Safety Accidents Using a 3D Scanner and a 3D Modeling Method

Kwangsoo Choi, MA*, Wonju-si, Gangwon-do 26460, SOUTH KOREA

Learning Overview: After attending this presentation, attendees will understand the feasibility of using a 3D scanner and a 3D modeling method as a tool for the analysis of building collapses and machinery collapses.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by introducing an effective tool for the analysis of building collapses and machinery collapses.

At present, the space and size of buildings, mechanical structures, and public facilities are becoming increasingly enormous in line with global industrialization and urbanization trends. As a result, safety accidents have occurred in larger forms than before. In the case of a large-scale safety accident, the damage and loss can be huge, and the possibility of loss of life is significant. Furthermore, the quality of life is adversely affected by increasing the public's anxiety. For these reasons, there is a strong demand for clearly identifying the cause of large-scale accidents more quickly.

In the case of large-scale safety accidents, many investigators and significant time are required when investigating the accident site. Furthermore, there are risks of additional accidents, requirements to restore the building rapidly, and difficulties in approaching the investigation site because of the possibility of additional collapse. It is thus challenging to investigate large-scale safety accidents.

Even after a field investigation, various studies should be conducted in order to prevent the same type of accident. Also, additional investigation is necessary in some cases. However, it is generally difficult to preserve the accident site for a long period of time.

A 3D laser scanner is a good tool when capturing 3D geometry of civil infrastructure, creating an as-built representation of a large industrial complex, reconstructing a crime scene, or generating 3D data for integration into building information modeling. The 3D model consists of a point cloud of geometric samples on the surface of the subject. These points can then be used to extrapolate the shape of the subject. If color information is collected at each point, then the colors on the surface of the subject can also be determined.

The use of a 3D scanner and a 3D modeling method can solve problems such as personnel shortage, the difficulty of approaching the accident site, challenges related to additional investigation and research, etc. Location information has been acquired by high speed, wideband scanning using a 3D scanner at the accident site and reconstructing the collapsed building using a 3D modeling method. The 3D modeling method can reenact the sequence of the accident.

This presentation will show how to apply the 3D scanner and 3D modeling method in real cases to reenact the accident and reconstruct a collapsed building.

3D Scanner, 3D Modeling Method, Reconstructed Collapsed Building