

Deformation Monitoring and Analysis of Structures Using Laser Scanners

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SUMMARY

Laser Scanners are relatively new technology, allowing rapid and very dense surveys of structures within an hour or so. Laser Scanners allow millions of angles and distances to be gathered onto a structure, creating a point cloud. This point cloud can then be linked to another of the same structure but scanned from a different location, allowing a 3D image of the structure to be created. This is made possible through placing targets on or adjacent to the structure and matching these in various point clouds. The draping of digital photos of the structures on the point clouds allows the final image to look realistic; allowing the user to be able to interpolate the point cloud easier.

Research is underway at The University of Nottingham investigating the use of laser scanners to aid deformation monitoring of structures over a period of time. The research investigates the resolution of the laser scanner, and determining the minimum deformation that can be detected through such a system. Trials underway at The University of Nottingham include monitoring the deformation of concrete beams during loading trials. The truth for these trials is provided through accurately surveying targets upon the beam before and after the deformation occurs. Furthermore, a trial upon a historic cathedral is also discussed.

One of the main areas of interest is the location and numbers of targets required for a successful trial.

The following paper outlines the work underway at the University of Nottingham, identifying the trials that are planned as well as the outcomes expected and their implications.