

The Application of Traditional Traverse Control Using a Terrestrial Laser Scanner, a Case Study of the Gold Hill Scheduled Monument, Shaftesbury, Dorset Uk

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SUMMARY

Dorset Council (DC) maintain accurate records of the Buttress wall retaining the grounds of Shaftesbury Abbey, built in the 14th century. Working with the council, the University of Derby has generated several models of the structure over 1.5 years.

The problem with the data generated is that cross matching the models and control profiles used by both parties led to a working tolerance of over +/- 20mm. This tolerance was not accurate enough to allow suitable monitoring of the structure to be performed.

The objective was to provide data which can be cross referenced to the past work undertaken by the study utilising existing stations and generating new reference points. The LASER scanner provides the option to perform a control survey using “traditional traverse” as with a total station. To further enhance the process and add to the existing control on-site, a series of resumption points were installed, these were included by both parties reinforce the data.

The results generated led to models which had much tighter control and reduced the working tolerance to +/- 3mm, this aligned well to the working limitation of the Scanner of 3.2mm centres at 10m, and the Robotic Total Station working to 3 seconds of arc.

The work led to a series of unexpected benefits, the data collection of the scanner required less tie-points to be used, thus saving time, manual handling and reducing the risk to the public and having less visual impact on the tourist site compared to other current target-based scan registration methods. The post processing was greatly simplified, and significant time savings were found.

The model created was fully explorable and the final output was generated as an Autodesk ReCap

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file type which aided in sharing the data and cross-checking the profiles.

Issues encountered included the proximity of the existing stations to listed buildings limiting working space/redundant observation within the local control network. The positioning of the setup locations for the total station provided a series of constant offsets, which could have compromised the data, had the general alignment of the wall and road not been of variable radii.

Concluding, many of the features of traditional Topographical surveying can be completed using Scanning equipment with many accuracy and working benefits.

Further development will be targeted towards generating GNSS fixed data allowing for improved data sharing while also converting the existing local control network into a geotagged one.

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