

Comparison and Analysis of GNSS-RTK Combined with 3D LiDAR Technology on Monument Maintenance Project

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The Precision is the first face problem in the restoration and preservation of Monument Maintenance Project. It may be that the initial coordinates of the position cannot be effectively determined by each object of historical antiquities or buildings, which seriously affects the proportional position when the combination is later reconstructed; or because the relative relationship with the natural environment is neglected, the restoration project is time consuming and even there may be errors that cannot be recovered.

Therefore, external reference control points play an important role in the 3D laser scanning operation of historical antiquities or buildings. Especially for long-term monitoring, it almost determines the accuracy of the following article scanning.

However, due to the unexpected situation on the spot, there are often control points lost, and there is a need for a rebuild-point project, which affects the 3D scanning operation of the later cultural relics. Rebuild-point project requires not only consistent precision, but also convenience and speed. This team takes the ancient house of Li-Tengfang, a national monument, as an example. When this term is studying on the restoration and preservation of Monument Maintenance Project, it is, and proposes newly method of rebuild-point project by comparison. A new method based on the viewpoint of engineering measurement is proposed to improve the lack of traditional operations.

The experimental results show that the GNSS-RTK rapidly-precise-positioning technology can replace the traditional static-measurement to practice rebuild-point project, and the 3D LiDAR ground control measurement which accuracy is enough can also be used as a reference for the other control points. Under the premise of high efficiency and constant accuracy, our team not only successfully introduced the concept of engineering measurement into the restoration and preservation of Monument Maintenance Project, but also completed the all 3D laser scanning operation on Li-Tengfang ancient house. All research processes can be provided to relevant units for reference.

Keywords: Monument Maintenance Project, Rebuild-point project, GNSS-RTK rapidly-precise-positioning positioning, 3D LiDAR Ground control measurement