

Application Research on Tunnel Convergence Deformation Monitoring Based on Mobile 3D Scanning Technology

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SUMMARY

Convergent deformation is one of the main diseases of subway tunnel, which is usually caused by the change of stress load around the tunnel, such as the influence of surrounding foundation pit construction, and the occurrence of convergent deformation will also cause tunnel cracks, seepage and other diseases. The traditional method of convergent deformation measurement is mainly to measure the change of the distance between the two reflectors by sticking the reflector on both sides of the tunnel and measuring the change of the distance between the two reflectors by total station. Because of the short window period at night, the efficiency of the method is low, and the results are difficult to express automatically. In this paper, a tunnel mobile scanning system based on track forward is designed. The hardware is mainly composed of rail mobile car and carrying 3 D laser scanner. It detects the tunnel convergence deformation, generates the positive projective image by quickly obtaining the tunnel 3 D point cloud, and matches the segment, and calculates the convergence deformation according to the 3 D point cloud information of each ring. Taking Qingdao metro as an example, this paper introduces the application of mobile scanning technology in the convergence deformation detection of subway tunnel, which provides some reference significance for the popularization and application of this technology in tunnel monitoring.

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