TECHNIQUE FOR DESIGNING AND CONSTRUCTING A GEODETIC NETWORK WHEN PERFORMING TERRESTRIAL LASER SCANNING AT INDUSTRIAL OBJECT

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When performing terrestrial laser scanning of large industrial facilities, it must give special attention to designing and establishing a geodetic network to datum transformation measurements into a coordinate system. However, the design of geodetic networks by traditional geodesy methods does not consider all the features of the technique of terrestrial laser scanning. Also worth taking into account is the specifics of laser scanning data processing. Therefore, it is necessary to develop a methodology for designing and establishing a geodetic network in the context of terrestrial laser scanning. For this, the article analyzes the features of terrestrial laser scanning of large industrial facilities and methods for measurement results processing. Based on the analysis and practical experience, developing a flow chart for establishing a geodetic network was on the condition that registration of point cloud performing used iterative closest points algorithm and datum transformation coordinate system performing using HDS targets. Also, based on practical experience, the dependence of the values of the root-mean-square error of registration point cloud and the root-mean-square error of laser scanning station positioning on the distance between the stations. As a result, a methodology for designing and establishing the geodetic network has been substantiated, including two stages. The first stage is the design and accuracy assessment of the geodetic control network, the coordinates of which are determined from the datum points by traditional geodesy methods. The second stage is the design and accuracy assessment of the laser scanning station positioning, the coordinates of which are determined from the geodetic control network.

Keywords: ICP algorithm, point cloud registration, datum transformation, geodetic network, Monte Carlo method, terrestrial laser scanning, accuracy assessment, designing, network of laser scanning station

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