IMPROVING THE METHODOLOGY FOR METROLOGICAL CERTIFICATION OF TOTAL STATIONS AND LIGHT RANGE FINDERS

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To ensure the uniformity of measurements, it is necessary to perform periodic verifications of geodetic instruments in accordance with the requirements of the relevant regulatory documents. In relation to total stations and light meters, ensuring the uniformity of measurements should be carried out by conducting annual periodic checks with the use of stationary reference bases of the 2nd or 3rd category, which were previously created in almost all regions of the country. However, to date, only two such bases have been preserved on the territory of the Russian Federation. The reason for this situation was the lack of proper metrological support for the line lengths of the reference bases themselves, caused by the need for organizational measures, the lack of trained specialists, as well as significant financial expenses for field work. In this regard, there was a scientific and technical task of developing a local calibration scheme (LCS) to provide periodic verifications of total stations and light-emitting diodes over the entire range of measured distances, which does not require the creation of stationary reference bases. For this purpose, the LCS scheme is proposed, based on the use of the method of direct distance measurements. Its essence lies in the simultaneous measurement of the selected distances by reference and verified total stations. To do this, a reference total station and a verifiable one are installed on two tripods located next to each other, which measure the same distance. After that, the total stations are swapped and the measurements are repeated. At the end of the measurement, the measured distances are compared with the reference and verified total stations. Then, based on the difference between these distances, a conclusion is made about the accuracy of the device being tested, as stated in the technical data sheet. The results of the implementation of the proposed LCS showed that its scheme provides the accuracy of measurements at the level of the 2nd category reference basis, and the methodology and accuracy of the length unit transmission meets the of regulatory requirements.

Keywords: metrological certification, local calibration scheme, total station, measurement error, reference device, distance, influence of air temperature, methods of comparison and direct measurements

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