THE EVOLUTION OF OPTICAL AND OPTOELECTRONIC DISTANCE MEASUREMENT TECHNIQUES IN APPLIED TOPOGRAPHY

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Abstract

Over the years, measurement techniques have evolved because of the increasing complexity of engineering works and execution speed while adapting to global economy needs. Contrary to angle measurements, distance measurements have involved a number of technical errors that could be diminished through technology advancement and innovative methods. In this paper we try to present a gradual evolution of these types of measurement methods and technologies. The complexity of these technologies has significantly decreased their execution time and increased their accuracy of determination reaching a few millimeters in certain situations. Thus, we set off from the first types of devices which determined distances around the 15th century and reach photogrammetry techniques of determination and the total smart station. This station uses methods and technologies which increase the speed and accuracy of the determination. We also present 3D scanning laser technology which is among the latest findings in the research area. Finally, we show different advantages and disadvantages of each of these presented methods.

Keywords: applied topography, optoelectronic distance measurement, 3D scanning laser, photogrammetry techniques