ID 41

Accuracy Analysis for Total Station Based on the Reflectorless Distance Measurement Using ANOVA

PRR Dissanyaka# and DS Munasinghe

Faculty of Geomatics, Sabaragamuwa University of Sri Lanka, Ratnapura, Sri Lanka

#rasikarajith94@gmial.com

Reflectorless distance measurement (REDM) was used to form various platforms in specific total stations for engineering projects, land surveys etc. It provided rapid measurement by saving time and field hands for surveyors; hence, the reliability of the measured distance from an object has great importance. Also, it increased personal safety without approaching unsafe surfaces. This study aimed to investigate the accuracy difference between the reflector and reflectorless distance of the total station with ten different materials and two different environmental conditions. The study was conducted outdoor using Sokkia SET530R and Trimble M3 total stations. Ten different materials were tested typically in construction fields. Two different conditions were investigated, including dry and wet targets. Two dissimilar incident angles were also inspected, 000 and 300 respectively. The experiment was evaluated by taking the reflector reading as true value to check the accuracy of reflectorless measurement. It concluded that Sokkia SET530R total station gained deviations between 12-23 mm for all conditions and incident angles. The Analysis of Variance (ANOVA) tables proved that eight materials were reflected with good accuracy except for granite and plywood materials for the Sokkia total station ($P<0.05$). In addition to that, the results of all materials showed a deviation between 5-8 mm for Trimble M3 total station at an incident angle of 000 for both dry and wet conditions.

***Keywords**: ANOVA, reflectorless, total station*