Estimating

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An often asked question when using a total station with a data collector is, "How do I estimate a project?" To answer this question, let's first discuss the productivity standards that we can expect of our field crews.

In our organization, we have found that most crews will make and record 350-500 measurements per day. This includes any notes that must be put into the system to define what was measured. When creating productivity standards, we also keep in mind that there is a learning curve involved. It usually takes a crew four to five projects to become familiar enough with the equipment and the coding system to start reaching the potential productivity of the system.

In our experience, a two person crew is most efficient when the typical spacing of the measurements is less than 50 feet. When working within this distance, the average rod person can acquire the next target during the time it takes the instrument operator to complete the measurement and input the codes to the data collector. The instrument operator usually spends 20 seconds (+ or -) sighting a target and recording a measurement and another 5-10 seconds coding the measurement.

When the general spacing of the data exceeds 50 feet, having a second rod person will significantly increase productivity. A second rod person allows the crew to have a target available for measurement when the instrument operator is ready to start another measurement coding sequence. Once the measurement is completed, the rod person can move to the next shot, and the instrument operator can code the measurement while the rod people are moving. If the distance of that move is 50 feet or greater, the instrument will be idle if you have only one rod person.

When dealing with strip topo situations, we have found that data must be acquired every 3 feet along the length of the job. In urban areas the data may seem to be more dense, but the right of ways are typically narrower. In more rural areas the data may seem sparse, but the right of ways are generally wider. The rule of thumb of one measurement for every 3 feet of linear topo works very well for estimating purposes. Using this estimate, the typical field crew will make and record between 350-500 measurements or 1000-1500 feet of strip topo per day. Typically, a two person crew equipped with recording total station and data collector pick up 1250 feet a day. Depending on the office/field reduction software being used, this data can produce both the planimetric and contour maps as well as transfer the data to an engineering design package with very little additional manipulation.

The accompanying field estimate worksheet (Figure 1) is one we use when sending a crew to the field, or when we are supporting one of our client firms on a project. As an example, let us take a project that we completed, involving one mile of topo for road construction in a rural setting. The field crew was billed at $80/hr. We estimated that it would take five days to complete the 5,500 feet of strip topo. This estimate took the ten instrument set ups that would be needed to do the project into account. If additional set ups were needed, we would have added a half hour to the project for each set up. (Two set ups per day is typical.) We projected that the field crew would be on the site for 40 hrs. at $80/hr. for a total of $3,200. Since the site was local, we estimated 65 miles per day for travel at $.30 per mile, totalling $100.

When we estimated the office procedures, we saw the operation as involving the production of planimetric and contour maps from the data gathered by the field crew. This estimate included two hours of interactive CAD work to prepare the drawings for the design staff. Check plots were made for the project at a cost of $25/drawing. The design file was produced simultaneously with the plan drawing, and all data was transferred to the design section on AutoCAD.

If you estimate strip topos, remember the following tips:

1. Estimate one measurement for every 3 feet of project.
2. If shots are greater than 50 feet, a second rod person adds to the efficiency of the crew.
3. You can expect a two-person crew equipped with a recording total station and data collector to pick up 1250 feet per day.

MAPserv, Incorporated

Estimate for Field Services

Field Work
Job assigned to Donna Cudejko
Meeting place & time
ABC Co. 8 a.m. 4 April

Job Location Latson Rd. N. of Allen

Size of site 5,500+

Site description Gravel Country Rd.

Relief on site 100+

Scope of project Topo for Rd. improv.
100' each side of centerline, 200' at
hills, all trees 4" and above

Traverse run before collection? Y/N

Estimated no. of setups 10

Estimated no. of data blocks 4600

Blocks per day 1000

Number of days 5

Field Estimate 3200

Reimbursable Expenses

Food	$
Lodging	$
Mileage/Travel	$ 100
Rental Equipment	$

Expense Estimate $ 100

Figure 1