

Surveying foundations the robotic way

Robotic surveying system saves time and labor, allowing one person to lay out concrete foundations and basements with great accuracy

BY ELLEN PAULI

Imagine you could lay out a concrete basement or foundation in one-fourth the usual time. Imagine you could cut your layout labor in half and reduce your risk of error when marking points. Sound like an impossible dream? It's not.

A growing number of concrete foundation contractors are saving time and labor and improving layout accuracy by using robotic surveying instruments to do one-person foundation layouts. Gary Bromley, owner of Action Basements, Lee's Summit, Mo., and a former president of the Concrete Foundations Association, says that the robotic surveying equipment pays for itself in less than a year. "Since we purchased the instrument in July 1997, we've reduced typical times on layout jobs from 14 or 15 hours to just four or five," he reports.

How the technology works

The Geodimeter System 600, from Spectra-Precision Surveying Inc., Itasca, Ill., consists of an unmanned robotic total station, which is operated from the measuring point, and a remote positioning unit (RPU). The total station has a built-in tracking module that automatically searches for and locks onto a target on the RPU as the operator moves the RPU rod from survey point to survey

point. This automatic tracking greatly reduces surveying time because the operator doesn't have to manually aim and focus.

Once the total station is set up, the operator can detach its portable keyboard—which also serves as a data collector—and attach it to the RPU rod to do all checking, recording and calculations at the survey point. If working with precalculated data, such as coordinates for the corners of a basement, the operator can load the data from a computer into the total station's keyboard.

The operator is directed to the first survey point by



Shaun Proctor, ©1997

Robotic surveying is a one-person job because the total station (left) can remain at the measuring point, unmanned. The station's built-in tracking module automatically searches for and locks onto a target on a remote positioning unit (RPU) carried by the operator. Coordinate data can be loaded from the total station onto a portable keyboard that attaches to the RPU rod.

reading the digital display in the keyboard. As the operator moves, the display is updated in real time, allowing the point to be reached quickly. When the display indicates that the operator has arrived at the correct point, the operator marks the point, then moves to the next point in the same manner.

The total station eliminates the risk of compounded errors, which can occur when incorrect points are used as references for marking the points that follow. "With string and tape, all mistakes are cumulative," says Barry Herbert, owner of Herbert Construction, a residential and commercial concrete contractor in Otsego, Mich. "But with the robotic total station, you start fresh with every point." This is because each point is independent of any other point.


Tackling complex layouts

Herbert, who purchased his robotic total station in 1996, says that the system has been particularly helpful in increasing layout speed

and accuracy on jobs involving complicated or multilevel basements. "When we're faced with a lot of points, angles and levels, the system helps us do quick, error-free measurements. It cuts a three- or four-hour job down to one hour."

To ensure greater accuracy, the system comes with various software programs that assist the operator in checking data. One of the software programs, Reference Line, allows Herbert to lay out an entire basement in relation to property lines. The built-in program enables an operator to place points anywhere along a baseline between two known coordinates or to set points parallel to this predetermined line. Herbert uses another program, DistOb, to check diagonal measurements.

R.A. Bright Construction, Naperville, Ill., uses robotic layout on larger jobs, including commercial projects. The contractor constructs foundation walls for 1,200 single-family homes as well as for about 800,000 square feet of large commercial structures annually.

"Using the robotic layout method, we can do in one day with one person what we'd ordinarily do in a week with two people," says R.A. Bright's George Prack. Accuracy is another benefit: "There are no mistakes in dimensioning; it doesn't matter how high or how far you're measuring—the robot can follow," Prack asserts. 

Ellen Pauli has been a business and technical writer for 12 years. Currently, she is senior writer for Trittech, Westmont, Ill., a firm providing business consulting to the construction industry.

PUBLICATION #C980292
Copyright © 1998, The Aberdeen Group
All rights reserved