



January-February 2011

Software Takes Off

needs to be done? What has been done? This is the easy way to find out.

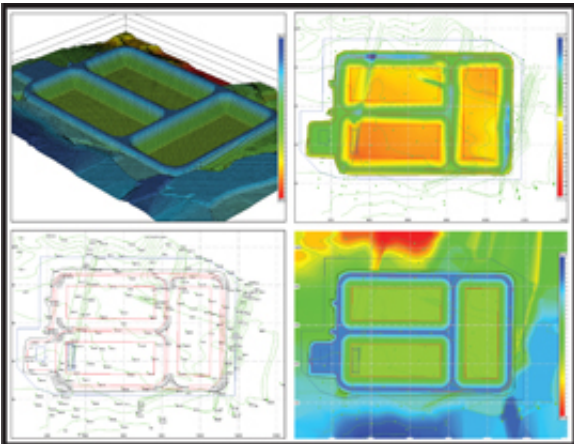


Photo: Trakware

By Paul Hull

Some experts in the field of takeoff software are rare specimens. They know a lot about their subject, they know how it works, they know how it can help us, but they don't talk as if they are the know-it-alls and the rest of us are the ignorant pupils. It's most refreshing, if rare. "Excavation software allows you to share your work with others," advises Gregg LaPore at Trakware Inc., one of the most praised producers in this sector, based in Albuquerque, NM. "If you are a project manager or business owner, excavation software allows you to check the takeoffs done by your estimators. If you are an estimator, it allows you to document your takeoffs with your manager, lead estimator, or boss. If work is being done in the field, you can share your printouts with field staff so that they can see exactly where work is being done or where to stake the site."

An interruption here. You may come across the word digitizer. You may need one. A digitizer is like a large electronic drafting table that has thousands of fine wires embedded in it. The digitizer also has a pen attached that emits a small signal. As the pen is moved across the digitizer, the digitizer uses all the tiny wires it has to sense exactly where the pen is located. The digitizer then sends the pen's position along a cable into the computer. This allows you to copy a paper plan into the computer by tracing in the elevation information shown on the plan. Digitizers can be rigid or flexible. Rigid digitizers are heavy and rugged and can be mounted on a stand, just like a drafting table. Flexible digitizers can be rolled up for carrying or storage. They require a hard surface, like a desk or drafting table, when you use them. How big are digitizers? They range usually from 30 inches by 36 inches to 48 inches by 60 inches. Those sizes refer to the actual, active area of the digitizer, so the total dimensions are larger. Your best source for finding out about digitizers, what they can do, and what they can cost, is probably GTCO Corp., in Maryland.

"There are two general methods for getting a site drawing into your excavation software," explains LaPore. "You can trace or import. If you work either from paper plans or from PDFs, you will need to trace your drawing into the software. If you are using paper plans, it will mean taping your paper plan to a digitizer and then using the digitizer's pen to trace in your drawing's information. If you wanted to trace an existing contour, you would click the 'Existing Contour' icon in the Trakware software, type in the contour's elevation, and then carefully run the digitizer's pen along the contour from one end to the other. As you traced in


the contour, it would appear on the screen. If you wanted to enter a new building pad, you would click the 'Proposed Building' icon, type in the pad's elevation, and then tap each corner of the building. You'd follow the same procedure for a proposed spot elevation. As each elevation is traced in, it appears on screen. Once all the elevations are traced in, your complete drawing will appear on-screen and it can then be calculated."

If you are using TIFFs or PDFs, you import the PDF/TIFF file into the software and it will be displayed on your computer screen. Then you use the computer's mouse to trace in your drawing's information, using the onscreen image as a guide.

The process is just like tracing from a paper plan except that you have the plan on your computer screen rather than on paper. If you are using AutoCAD files, you import the drawing rather than trace it in. Importing an AutoCAD drawing faster than tracing it from a paper or electronic plan, but these drawings sometimes require a lot of editing. "To import an AutoCAD file, you would first open the AutoCAD file in your Trakware excavation software," notes LaPore. "Then you select which items to import into your takeoff. Since not every item in the AutoCAD drawing will be important to your takeoff, you would then select certain layers to import or certain objects within the layers to import. Once all the information is imported into the software, the proposed elevations will need to be edited. Editing is required because the AutoCAD operator typically does not assign elevations to any of the proposed objects but rather uses text labels instead to enhance readability. Correcting the proposed elevations can be time consuming, but the overall process is always faster and more accurate than digitizing."

Good Reasons for Using Takeoff Software

Every profitable estimate starts with an accurate takeoff and wise contractors are moving away from cumbersome paper takeoff processes to improve their accountability, accuracy, and efficiency. Maxwell Systems offers digital takeoff for those contractors who want to eliminate the cost and hassle of paper blueprints. With digital takeoff, contractors can perform takeoffs quickly and accurately right on their monitor. "The manual method was very difficult, as odd shapes were tough to takeoff and it was challenging to get precise values," explains Bret Chumbley, vice president at Anderson Commercial Concrete. "We needed to increase the number of takeoffs we were doing, and it was tough because of the time-consuming manual process we used." Anderson automated its takeoff and estimating processes by turning to Maxwell Systems. "At first we primarily used Maxwell Systems ProContractorMX software for takeoff, and it made a big difference in both speed and accuracy," notes Chumbley. "Since then it has really sped up our processes and enables us to develop very accurate estimates and more of them." By using software for takeoff—with digitized or digital plans—sitework contractors can work more efficiently, bid more jobs, win more jobs, and make more profit.

Maxwell Systems will provide solutions specifically tailored for earthwork, so contractors can efficiently takeoff existing contours, proposed contours, spot elevations, and any sitework elements; calculate grade; and quickly identify borings, substrata, swell, and yield. Plus estimators can raise or lower the elevations and strip or replace topsoil as needed to balance their cut-and-fill work for important savings. DG Frondorf and Associates LLC uses Maxwell Systems software for earthwork. "If we do an earthwork takeoff manually, there is a greater opportunity for error," asserts company founder Daniel G. Frondorf, CPE. "The Maxwell Systems program does exactly what we would do manually, but it's quicker and more reliable. We can nail down the details to the last cubic yard, eliminating guesswork and waste on the projects. We are able to plug in numbers with certainty and be more accurate in cost estimating and bids." Maxwell Systems digital takeoff also gives estimators the ability to overlay addendum drawings, flag changes, and eliminate the possibility of missing the changes and additional costs. Because change orders can drastically affect a project's profitability, some contractors have seen their takeoff software pay for itself with a single won change order. 

Maxwell Systems also offers verification features, such as interactive 3D Visual Assemblies, realistic aerial views of existing and proposed elevations, a virtual fly-by tool to survey the site, and a tool to balance an entire site in mere seconds. These features help contractors accomplish takeoff faster and with precision, providing comprehensive data to see the job come together. Christian Mayeske, project manager and estimator for Milton Mayeske & Sons Inc., values these software capabilities in his Maxwell Systems solution: "We have a process that gives us speed and the ability to turn estimates out quickly. And with the verification tools, we can ensure our calculations are not thrown off by errors during takeoff," comments Mayeske. "Speed and accuracy are critical in an economy that requires contractors to bid more work to remain in business." Beyond the takeoff and estimate, Maxwell Systems offers seamless business management solutions that help construction companies streamline processes throughout the project life cycle. Tory Tesauro is president of PT Masonry, a contractor using Maxwell Systems ProContractorMX software as its complete, end-to-end business management solution. "ProContractorMX will help us get and stay organized and know our bottom line. Having our plans available in our estimating process and through final payments will be a major benefit. We believe this all-in-one tool will help us run our company more efficiently and increase our profits."



It's not Only for the Big Companies

"Automating quantity takeoff is a necessary transition in today's market," asserts Sheridan Scott for On Center Software in The Woodlands, TX. "For



Photo: Maxwell Systems

Compare the difference in convenience between paper and software.

One practical question I have heard, and it is heard almost everywhere, is: “How can we get the drawing of a huge blueprint onto our little computer screens? We don’t have all the sophisticated equipment of big contractors.” There is a helpful answer from Steve Warfle, product manager for software at InSite Software. “InSite Software’s PDF takeoff capabilities allow even the biggest projects to be taken off on small screens,” explains Warfle. “Many customers are reluctant to move away from paper plans, assuming it would be difficult to handle a large project on a computer screen. With our dual screen technology and coordinated cursor, you can perform takeoffs at zoom level difficult to achieve with a paper plan, and be able to keep your place on the takeoff. That means takeoffs can now be performed about anywhere. We’ve taken support calls from homes, site trailers, and even pickup cabs, from customers doing PDF takeoffs. Add automatic line tracking and the ability to combine detail sheets into one large takeoff and expensive digitizers have become obsolete. Of course, in the office environment, inexpensive LCD monitors have made InSite’s multiple monitor support a most productive setup.”

InSite SiteWork can be used with three types of input. You can use image files (PDF or TIF, for example) as mentioned in the previous paragraph; you can use CAD files (DWG or DXF, for example); you can use data imported from a data collector. An optional digitizer can be connected for takeoff from paper plans. The advantage of Image takeoff is that you’ll get the same accurate results as from a digitizer-based takeoff, but without the expense of a digitizer and in a completely portable environment. Choose Enter Map and the feature you wish to trace. Tracing the feature highlights the line. Use the line-tracing tool to have the most accurate take-off (often better than digitizing). You would use the layer menu to control which features are displayed when tracing your image. InSite SiteWork’s Paperless Image Take-Off allows two screens to be used, one for the tracing of the PDF, and the other screen to show the takeoff progress. It can be a split-screen display for single monitors, but it is probably best suited where two monitors are used.

If you are using a CAD file to get the earthwork takeoff, it takes only minutes and you don’t have to own a CAD program. InSite SiteWork offers an amazing import tool to take the headaches out of CAD import. It can import any version of DWG or DXF CAD files and saves the time of tracing the plan. “Since InSite has no limit on the number of points or jobs sizes, no project is too big,” observes Warfle. “You can import Existing, Proposed, Stripping, Subgrades, and Soil Borings. InSite explodes blocks, stitches exploded polylines back together, and allows 3D elevations to be assigned. No other CAD import tool comes close.” And you still

don’t have to be a multi-multimillion dollar contractor to do it all! 

Faster Bidding Can Mean More Bids

If you can complete your accurate bids three, four, or even five times faster than before, it becomes realistic that you can bid three, four, or even more projects. Excavation software’s increased speed means you have more time available for whatever you wish. That could mean working on more bids, more time building your company, or even more time at home. The secret of your new success will be in the time and the accuracy. Any bid must be accurate, and your excavation software will be that, thanks to the capabilities of your computer. When we were doing drawings that could take five or six hours by hand, the likelihood of error was great (and it could be an error that is multiplied dangerously as it goes through the bidding process). That same drawing that

used to take a few hours, with errors, with grid spacing of, say, 50 feet, can now be done in seconds with the spacing at 0.1 foot! It's simple to check, too. Is it a 3D view, a cross-section, or a plan view colored by cut-fill depth or elevation? Excavation software allows you to check and double-check your takeoffs and design errors. If you do find a mistake, you can correct it and recalculate the job in seconds. It used to take much, much longer to total the job again and that was if you could find the mistake. How long does it take to learn all this? At Trakware you are given more than four hours of training videos so that you can watch an overview of a takeoff or see exactly how certain features work, so you would progress in the program at a speed convenient to you, just you, not a whole classroom of nervous learners. One user put this ease of learning for this software in a nutshell. "I've been a Trakware Earthworks user since 1993, and I have never been disappointed by its ease of use, results, or the support from the Trakware staff," says Dick Vincens, senior project estimator for Extreme Edge Excavating Inc. Other software providers mentioned in this article have similar testimonials.



Photo: Maxwell Systems
Everything can be updated or changed on your screen, in your office.

One type of application for OnCenter's On-Screen Takeoff that grabbed my attention may not be appropriate for those who have only giant earthmoving projects, but it is an everyday challenge for some contractors. If you are planning a residential backyard or even a golf course, you will meet many curves and they can be difficult to judge. In this software, everything marked on the plan (such as flower beds, ponds, and rock gardens) is tracked and counted. Volumes and excavations can be estimated accurately to solve the problems of mulch beds and sand traps, and then you can import the data into Quick Bid, where you apply all the plant and materials pricing. You can also adjust labor rates, account for taxes and waste, and even shop several vendors at once for the best price quotes. Takeoff and bidding software is not, then, only for the very big companies and contractors.

It comes down to accuracy and time, with takeoff software giving you massive improvement in each area. "Using software like Carlson Takeoff is a quantum leap forward from doing takeoffs by hand," says Todd Carlson at Carlson Software in Watertown, MA. "Instead of using grids to estimate cut and fill, software like Carlson Takeoff uses surface models that utilize the entirety of the engineer's plans to calculate volumes. This improves dramatically the accuracy of estimates and can save you thousands of dollars on a single job. In a way, estimating is not quite the right word anymore, because the quantities generated as accurate as data provided by the engineer."

"With software like Carlson Takeoff you can have confidence in the numbers produced by verifying your work through tools like 3D renderings, Cut/Fill Color Maps, Surface Profiles, and similar features," adds Carlson. "These visualizations can make your work more accessible to vested parties who might not be construction professionals. The time saved in achieving this is another major benefit. Not only is estimating by hand less accurate, it will take you longer to get there. What can take half a day to achieve with software can take a whole week by hand. With today's software, such a use (or waste) of time is needless." Another advantage of using software that has been pointed out is its ability to "live beyond the estimating table." Carlson Takeoff, for example, can be used to support and run survey equipment and machine control in the field. The software puts contractors on equal footing with engineering firms who use similar software, to make companies using it more productive and efficient.

There is still a place for doing takeoff by hand. It is the foundation for a solid understanding of estimating in general, but companies that don't also use software—such as that described in this article—are putting themselves at a disadvantage today...and tomorrow.

Topics: [Technology](#), [Takeoff](#), [Software](#)