

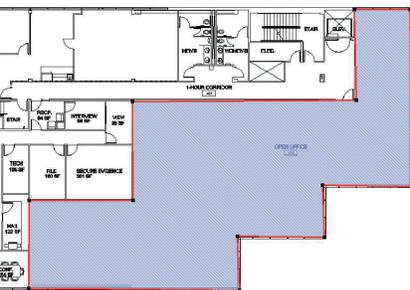
Trimble GCEstimator Suite

The Evolution of Estimating and Quantity Takeoff Tools

Quantity Takeoff Tools Have Improved Greatly Over the Years

Depending on how long you've been in the industry, you've witnessed some significant advancements in quantity takeoff technologies. Over the last 20 years, the tools used to input quantities have evolved considerably from paper plans and roller balls to digitizer tablets to electronic 2D plan takeoffs with .PDFs and .TFFs images, to today's current method of 3D quantity takeoffs from BIM (building information models). While quantity takeoff inputs have evolved 3-4 times, the need for highly flexible, adaptable cost estimating software has remained relatively constant.

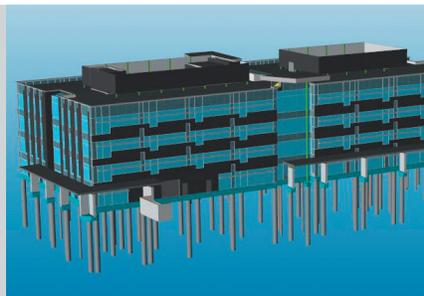
Appropriately so, the market has demanded solutions that dramatically reduce time spent performing quantity takeoffs. A "drum beat" among estimators over the years has been, "I didn't get a degree in Construction Management so I could dedicate half my life to counting doors, windows, and columns". Subsequently, we've seen an evolution of 2D quantity takeoff tools that have freed up more time for estimators to explore value engineering options, providing owners with options that result in an improved project deliverable.



Performing 2D quantity takeoff solutions from electronic plans were widely adopted. These tools allowed an estimator to maintain their confidence in the quantities, as these solutions provide a highly visual audit trail.

In most cases, these 2D takeoff applications allow an estimator to fill in the gaps. Sometimes, it's even possible for an estimator to digitize construction systems that were not included in the plans. After all, the estimator has to be able to read the supporting scope documents and determine "design intent". So it was important that 2D takeoff solutions have the ability to add document information and note assumptions.

The number of quantity takeoff tools and estimating solutions required to effectively respond to today's diverse projects presents a set of real challenges.



3D BIM Models Further Reduce Time Spent Performing Quantity Takeoffs

In today's market, contractor's project portfolios are diverse. General contractors have an ever increasing number of projects that are model based, with the majority of projects still based on 2D plans. In fact, even projects which include a 3D BIM Model, will not have all construction components represented in the model, resulting in the need to perform a hybrid of both 3D and 2D quantity takeoffs. 3D BIM models have introduced another dramatic step forward in reducing the time associated with performing quantity takeoffs. For example, the ability to query a 3D model and instantly see the total surface area of interior walls on the first floor of a large healthcare facility, without the need to digitize the walls, provides an 80-90 percent increase in productivity.

Early Attempts at 3D Quantity Takeoff Solutions Fall Short

As CAD authoring solutions began providing 3D object-oriented design tools, many of them proclaimed to offer quantity takeoff and estimating solutions as a byproduct of the model. Contractors that evaluated these tools quickly discovered that the quantities generated from the models were too design centric and not construction focused.

In addition, contractors quickly discovered that these tools fell short of providing a viable estimating solution, at best, they produced a simple bill of materials, with construction systems absent from the model and limited support for the labor cost production rates necessary to complete an estimate.

Some of these early solutions failed due to poor design; namely, a feature set that demonstrated a lack of understanding of the estimating discipline. Any 3D takeoff tool that produced quantities with the inability of an estimator to confirm those quantities in the context of the model, were doomed for failure. The developers of these tools didn't understand that an estimator accomplishes several essential tasks when performing a takeoff. It's not only about performing a quantity takeoff, it's about an estimator constructing the project in their head, and becoming familiar enough with the project that they are willing to put their signature on the accuracy of their estimate.

Today's Estimating and Quantity Takeoff Challenges

Until Now, Contractors Required 4-5 Disparate Tools to Produce an Estimate

Multiple inputs require separate tools for 2D Takeoff vs. 3D Takeoff. Typically these tools act independently of the estimating software that will ultimately need to consume those quantities. In addition, separate takeoff tools require the estimator to learn multiple systems, each with their unique user interface workflows.

It gets worse. In many cases, these tools were dependent on a cost library that was specific to the takeoff tool. You can begin to see the complexity and redundancy; a cost library for the 2D takeoff solution, a cost library for the 3D takeoff solution, and in most cases an entirely separate cost library for the actual estimating software. In other words, every time you receive material price updates, someone has to update that price in as many as three separate cost libraries.

Identifying Quantity Variances from One Version of the Model to the Next

Today, model-based design tools are so powerful, they encourage design alternatives to be implemented throughout the preconstruction phase. As the model becomes more and more inclusive of all construction systems, the ability to identify the design changes from one iteration of the model to the next becomes more and more complex.

In the end, it's not enough to perform a single takeoff with the initial design. Instead, an estimator is constantly looking for ways to highlight or isolate design changes from one version of the design to the next. In most cases, an estimator has to use one software solution to locate the design changes in the model, and a separate software solution to locate the change on the next set of 2D plans.

The Iterative Design Process Can Easily Make the Estimate Obsolete

In today's world, it's not uncommon for a contractor to receive updated models and 2D plans, every two to three weeks. Often, when new iterations of the model are delivered, the design changes usually result in quantity differences. Keeping the cost estimate in "lock-step" with the current quantities in the model is time consuming and invites error. Ram Ganapathy, of DPR Construction summed it up: Attempting to tie together many different digital takeoff and estimating tools within a 5D workflow can be time consuming and cumbersome. As an existing Vico

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customer, I'm excited about Trimble GCEstimator because it's a purpose-built estimating solution that will move the industry away from 'data stitching' and instead empower native data mapping that will serve as an integral information engine to our project information system."

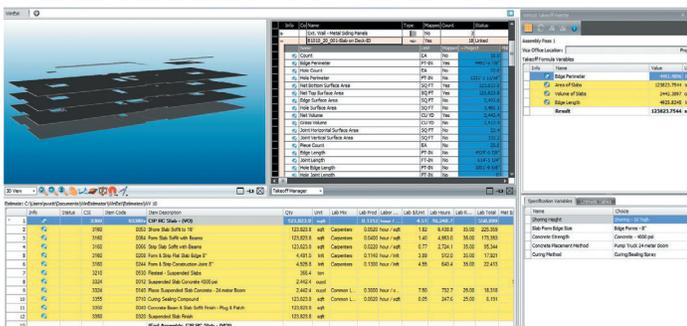
Trimble's GCEstimator Suite Overcomes These Challenges

Trimble has dramatically changed the building construction landscape by delivering on its strategy to provide GC / CM firms with highly integrated "best of breed" solutions. The recent introduction of Trimble GCEstimator solution is designed to increase efficiency and reduce the complexity of deploying multiple vendor solutions with limited integration. In a perfect world, you would have a single quantity takeoff solution for both model based quantities and 2D plans, linked to a single "database driven" estimating solution.

One Takeoff Environment for 3D and 2D Takeoff

Trimble's GCEstimator Suite provides a single takeoff solution for both 3D BIM models and 2D plans. It's no longer necessary to use two separate takeoff applications to support 3D and 2D inputs. This flexible solution allows for 3D quantity extraction from BIM models, as well as the ability to perform a digitized takeoff from 2D .pdf files. As stated earlier, even when you have access to a 3D model, some percentage of your takeoff will need to be done from 2D electronic plans. So GC Takeoff Manager allows you to easily respond to today's reality of needing a 3D / 2D takeoff solution. This tool also tackles the issue of being able to apply takeoff formulas to the 3D model, which allows an estimator to extract "estimator friendly" quantities from the model, as opposed to design quantities. Maybe restate the problem mentioned earlier in the doc.

That's of course not the only problem solved with the Trimble GCEstimator Suite. In addition, these 3D and 2D quantities can be dynamically linked with your estimating cost library, allowing you to more quickly produce an estimate from your takeoff.



Trimble's GCEstimator suite provides a highly integrated desktop that allows the estimator to visualize a 3D view of isolated construction systems alongside the associated database items and assemblies contained in the estimate.

One Estimating Cost Library to Use and Maintain

Trimble GCEstimator Suite allows an estimator to use one database / cost library to drive all their estimates. Trimble recognizes that your need for a highly adaptable, flexible estimating system doesn't change based on the quantity inputs available for a specific project. Now you can have one cost library that drives your estimating practices, whether or not your input is coming from a 3D model, 2D electronic plans, or both. The maintenance nightmare of trying to deploy and maintain 3-4 estimating cost libraries goes away with GCEstimator.

Document Controller for Version Control and Design Changes

It's not enough just to review the BIM model and 2D electronic plans to extract the initial quantities, it's critical to be able to review and update the quantities with each new iteration of the design. Being able to compare one iteration of the model to the next and quickly visually see the quantity variances is at the heart of the GCEstimator solution. The ability to both highlight and isolate these design differences allows you to clearly explain the cost impact of these design changes. In today's world, it's not enough to just tell and owner that the cost of their project is changing, instead you need to defend those changes based on quantity differences. Trimble GCEstimator meets that challenge head-on.

Estimate Updated to Reflect Changes in Model Quantities and 2D Plans

A change to a handful of objects contained in the BIM model can render 100s of items obsolete in the cost estimate. Once again, this is not an issue with GCEstimator Suite doing the work for you. When object properties in the model are used to satisfy the dimensional values contained in the estimate items and assemblies, you've established a dynamic link. When you receive an updated version of the model or the 2D electronic plans and quantities change, you are alerted to which estimate items and assemblies are impacted by those changes. You can easily review and update the estimate to reflect the new quantities.

Make no mistake, Trimble GCEstimator keeps the estimator in control. You are able to review and selectively update the estimate. We understand, it's never acceptable to modify the cost estimate without the estimator's knowledge. Lastly, the estimating audit trail will keep a record of every change made to an estimate item over the life of the estimate.

In Summary

It's time to let your work dictate the systems and software you use each day. It is no longer reasonable to expect that you will switch your estimating and takeoff solutions to match the inputs you receive. By doing so, you'll discover vast improvements in productivity, accuracy and confidence.

In construction estimating, there's no substitute for complete confidence in your work. Trimble GCEstimator Suite keeps estimators in complete control for better estimates, improved traceability and a vastly streamlined workflow.