

# Comparing Spreadsheets and Dedicated Estimating Software

By James E. Davis

eCaliper

A Marathon System Services Business

By far and away, the most commonly used software technology to facilitate estimating calculations is a spreadsheet program of some sort, typically either Microsoft Excel® or Lotus 1-2-3®. These software tools are extremely flexible and powerful, within certain boundaries. The question that faces the estimator of today is “when have I outgrown the functionality of a spreadsheet program?” Granted, a spreadsheet program is familiar and somewhat comfortable to many users. A spreadsheet is specifically designed to accurately and easily extend quantities, such as those derived from the typical takeoff process. The purpose of this paper is to analyze how and when a spreadsheet can “run out of gas” in the dynamic world of estimating in today’s marketplace.

## Evolution of Estimating Technologies

As we look at the evolution of estimating processes, we see a history of new technologies that have been incorporated over time to assist contractors with both getting a job and making a profit. Initially, estimates were prepared by hand, using ledger paper in columnar format. Adding machines and typewriters for proposals eventually gave way to programmable calculators and word processors. When introduced, even the early, character-based spreadsheet programs were useful in estimating as they were designed to most closely duplicate what estimators were doing by hand. Estimating programs were introduced in a character environment, but the adoption rate was low, given the challenges of implementation with the complex, less intuitive user interface. With the arrival of the Windows Operating System, the user interface for spreadsheets became much easier to use. More and more estimators gravitated to the use of spreadsheets to provide controls over mathematical operations and extensions. As the early adopters created multiple spreadsheets for use in estimating processes, more estimators used those spreadsheets to help them with their jobs. In today’s world, even given the availability of many quality estimating software products for all segments of the construction industry, spreadsheets represent the most dominant estimating automation tool in use. Part of the explanation is the comfort level that estimators have with their spreadsheets.

Estimating technologies available today cover a wide range of capabilities from the takeoff process through bid presentation and job management. Newer technologies have become more affordable and useful, given the lower cost of high-powered computer systems. We will discuss the foundation for a properly designed database-driven, dedicated estimating system, and how that compares with the use of spreadsheet programs to handle the estimating functions at your business.

### ***Objective of Using Technology in the Estimating Process***

While we could debate the true objective of applying technology to the process of commercial construction estimating, it is hard to argue with the premise that software used for estimating should *optimize* all estimating functions. Spreadsheets accomplish only part of this objective. A spreadsheet is easy to use and performs accurate mathematical operations within the limits set forth by the user. A true automated estimating department should be able to do more than simply crunch numbers. First, the estimator needs to read and interpret blueprints quickly. Secondly, the estimator should approach the creation of the estimate in a methodical way. Third, the estimator should be able to access and apply historical data accurately.

What this means is that a quality, dedicated estimating software system should result in a number of specific benefits for the contractor, including:

1. increase the speed of takeoffs
2. standardize estimating processes throughout the estimating department and across the company
3. stimulate accuracy on all bidding activity, whether direct or indirect using subcontractor bids
4. organize a database of historical pricing from prior jobs for future reference.

While estimating is critical on an enterprise wide basis to any construction firm, it remains an individual form of art in a way unique to seasoned estimators. This means that any list of objectives for an automated estimating process needs to balance uniformity with flexibility to accommodate the various methods deployed by estimators successfully in all areas of construction. Many estimating software products have fallen short in this category; thereby creating a vacuum only individually created spreadsheets seemed to fill effectively.

## Specific Spreadsheet Comparisons

The main benefits of a spreadsheet include the user interface, the ability for calculations and accurate extensions or totals. Dedicated estimating software like eCaliper has the spreadsheet look and feel, so the user interface really is a non-issue. Most quality dedicated estimating software systems also provide a multitude of options for calculations, extensions and totals. So, the question remains, where does the estimator “hit the wall” with a spreadsheet program?

Most spreadsheet estimates start from a template and grow from there. One problem we’ve seen is that the template file continues to grow and grow over time. Opening and closing and saving these files can become more and more of an issue. We’ve all heard the horror stories about accidentally overwriting a spreadsheet filled with special formulas, and lots of man hours, when improperly saving the latest version. Pre-existing formulas work well, unless you typed in a number in place of the formula, saved the spreadsheet and assumed the formula remained. Future co-dependent calculations may be jeopardized by that one instance where the formula was overwritten or simply wrong. Inserting rows or columns or both can also adversely affect formulas or calculations if the user is not extremely careful.

Of course, finding individual items in a spreadsheet is fairly easy with the control F find option. However, the typical estimate has many occurrences of the same item or similar items. With a spreadsheet, despite the filters and sorting options, there are significant limits on analyzing groups of cost items. It’s almost impossible to segment certain materials or labor entries with the express purpose of applying cost adjustments to just those items. This is an important feature of some of better estimating software products when adjustments are required at the last minute on bid day to multiple line items because a vendor has provided some preferential pricing to help the contractor win the bid.

During the takeoff process, *speed* and *accuracy* are the critical elements to success. Although there are digitizer interface products available for some spreadsheet software programs, the interface is limited. The typical takeoff requires a series of related calculations to occur when digitizing or entering basic measurements. With eCaliper and some of the other quality estimating software systems, the database is constructed in such a way that these related calculations occur reliably and accurately by simply entering the base measurements. This occurs because of the logic associated with assemblies, sub-assemblies, crews and other resources that are mathematically linked. Initializing a digitized takeoff usually requires the estimator to set the scale for the drawing, and the individual detailed sections of the drawing. This is challenging to say the least with a spreadsheet.

Most eCaliper users have multiple estimators, so true *multi-user functionality* is extremely important. By definition, a spreadsheet is only available to a single user. The other option is to do what some users are forced to do with other limited estimating systems, divide up the estimate and work on it in pieces. Sound okay? Try it on bid day, when real time totals are crucial and deadlines are rapidly approaching.

### **Is the Estimator or the Software the Most Important Element?**

Obviously, the estimator is the most important element of success in the pre-construction bidding process at any construction firm. *Maximizing the efficiencies* of the estimator is where software plays a key role. With a spreadsheet, the estimator is required to work alone on each individual estimate. In a growing concern, this type of environment is not necessarily the most efficient for the estimator.

A multi-user environment allows the estimating system to *scale* with the growth of the construction business. Add estimators, but give them an island of information? This is a problem, especially where each estimator has a special area of expertise that needs to be combined with the other areas to complete the project bid. A multi-user system allows for estimators to easily share information and collaborate on complex estimates efficiently. Furthermore, a multi-user environment provides an opportunity for standardization of processes and uniformity of the data entry and retrieval.

One other advantage that we hear about from our users is that they can build databases, including multi-level assemblies, and leverage the experience of the top estimators across their entire estimating department as this information is available to all at any time. Capture best practices and share the knowledge base of the top estimators. This is a winning formula, especially when a construction company experiences turnover or expansion and has to train new estimators. With the eCaliper system, we have also realized that estimators have individual requirements, so we have included the ability for each user to establish his or her preferences while still participating in a true collaborative environment. Providing the estimator with the *best software tools* is what dedicated estimating systems are all about.

### **Integration with Other Systems**

In most construction companies, estimating is only the beginning piece of a very comprehensive puzzle. Once a bid has been won, the contract needs to be finalized, schedules need to be arranged and the project needs to begin. Each phase of the job needs to be properly managed and costs need to be monitored to assure the overall success of the project when complete.

Properly designed dedicated estimating software has an *export capability* to populate key statistical data fields in related systems, including project management and job cost accounting. The project management system can be updated with scheduling data based upon activity codes within the estimating system. All the estimated project costs by phase code can be transferred to the job cost accounting system to establish initial project budgets against which actual operating statistics can be compared.

With eCaliper and some of the other leading estimating software systems, actual job history statistics can be retrieved back from job cost accounting and stored for use in the future by estimators bidding projects with similar characteristics.

As spreadsheets are not usually designed to include relationships between costs and job phase codes, it is difficult to interface with job cost accounting systems. Historical data is virtually impossible to track without a database underlying the estimates and cost items contained therein.

### **Are Dedicated Estimating Software Systems a Panacea?**

As the old saying goes, the most powerful software is the software that is used. This applies to estimating systems as well. Using a spreadsheet successfully is better than not using a software program at all. Certainly, the mere fact that quality estimating software systems are now available for all areas of construction activity does not create a panacea for the estimating community. Successfully *using* new generation, dedicated estimating software needs to be the result of any selection process.

To use software successfully, an implementation and training plan is critical. If you are anticipating an electronic conversion to a new estimating software system, make sure to plan your conversion carefully. Look at the creation of the database as an important first step in the system planning process. Hopefully, you will find that you have more resources at your disposal than you realize upon which to build a quality database for your areas of construction activity. Make sure that you have someone responsible for building the database who understands your business and has the time to invest with your vendor on training to understand the ramifications of how the database is designed. Many times, individuals make decisions on database creation without understanding how those decisions limit the software functionality down the road. Spend the time to build or convert the database and then check it carefully. Hopefully, your software vendor will have tools and services available to assist you each step along the way. Once your database has been established, make sure you have adequate initial training and follow-up training for all the users of your new estimating program, both the estimators and project managers.

We hear so often of companies that purchase software and then don't implement it successfully. We recommend the establishment of "tiers of success". Not always will the system be implemented to its optimum level when you begin using it. Nonetheless, you have attained a tier of success. Make sure you have worked out a plan for follow-up training with your vendor so that you can attain new tiers of success as you become more familiar with the software. Implementation is a *continuum*, not an end in itself.

In the world of technology today, web based training is becoming more and more available. I know that we perform a lot of training sessions over the web for our customers using the latest web based training and demonstration tools. This allows for shorter duration training sessions concentrated on specific areas of the software, without the need for always scheduling full day training days on-site. It's important to note that dedicated estimating software will not be a panacea if it is not set up and used correctly. Please invest adequately in training, both initially and in the future. The dividends from this investment will become self-evident.

Despite all the benefits we've discussed in this paper, dedicated estimating software will not completely eliminate the potential for errors. We all find ourselves interrupted as we try to focus on the job at hand. This happens all the time to estimators, no matter how hard they try to concentrate. When this does occur, some degree of error is inevitable, especially during the takeoff process. By establishing proper safeguards in the setup of your dedicated estimating software system, new technologies can minimize errors. Our customers generally perform estimate reviews and validation activities. Some more formal than others. Since the eCaliper system stores all the digital images you capture through digitizing plans or downloading plans from a plan room, the review process begins with the takeoff. The technology inherent in the review of digital plans makes it extremely easy for the chief estimator to validate the quantities taken off from a set of plans. Once the takeoff is validated, good estimating software will allow for convenient reviews of areas and phases for each project, sorting the material, labor and equipment in different ways for a multitude of purposes. Adding this review process with the software tools now available will allow you to check both the math and the cost items for completeness and accuracy in an efficient manner, thereby minimizing potential errors.

### **Other Benefits**

Customer Service is an area of growing importance in the construction industry. A good estimating software system will allow the estimator to create estimates in the form that the client desires. A spreadsheet has limited reporting capability, without exporting it to a word document. With dedicated estimating software, a construction company also can typically turn estimates around more quickly, thereby improving client responsiveness. This is particularly important at crunch time, especially when last minute plan changes arrive from the architect or engineer.

Time savings are obvious when last minute changes to a bid are required. Changes are relatively easy to accomplish with a dedicated estimating software system, especially when you can change a few parameters and have these changes ripple through all the affected areas of the estimate. A spreadsheet makes the process of changes a bit more challenging since you typically have to go to each affected area and make the changes one by one, instead of globally. You also have to be careful to make sure that you've caught each and every item that needs to be modified. With a dedicated, database-driven estimating software system, recalculations are usually very straight-forward. It is also easier to perform your review and validation systematically. Finally, the integration of all related documents, such as an invitation to bid for your subcontractors, when applicable, or purchase orders for your vendors is standard operating procedure for quality estimating software products. These capabilities are a time saver as well. We believe that the estimator should spend less time estimating and more time making sure the job estimate is accurate.

The benefit of accuracy in estimating is a fairly deep subject. Accuracy problems can result from the takeoff process, the specification of incorrect materials, rounding errors and a number of other areas. An automated takeoff process connected to a well thought out and complete database reduces these accuracy problems immensely. A properly designed database associated with quality estimating software essentially creates checklists within each area and phase of a project, thereby resulting in more complete estimates as well. With an accurate estimating system in place, you reduce the risk of bidding too high and not getting the job or bidding too low and losing money on the project as a whole.

Making sure the estimating software *fits* your business is very, very important as well. It's crucial to work with a specialized estimating software vendor that can provide the services necessary to tailor the system to your estimators and your business needs. Have you ever tried to work with Microsoft, the developer of Excel, to customize a few features to optimize the software to fit your particular application requirements? Didn't think so. Most people simply work within the confines of spreadsheet software. A quality estimating software vendor will have services available to *custom-fit* your database conversion, training plan, reporting and software functionality if necessary to assure the success of the implementation at your business.

## **Conclusion**

Dedicated estimating software will not always be the best solution for every construction company faced with estimating challenges. Some companies can be successful using spreadsheets. However, spreadsheets do "run out of gas", especially in a multiple estimator environment, where speed, efficiency, scalability and collaboration become imperative. With spreadsheets, there exist risks with formulas, overwriting saved files,

sorting and analyzing groups of data and performing the related calculations common during the takeoff process.

Although many of our seasoned users have found that they can estimate more jobs with the same estimating resources, simply replacing your spreadsheet estimating with dedicated, database-driven estimating software will not necessarily vastly improve the quantity of estimates you can perform within a given time period. The results will depend upon your individual processes. However, dedicated estimating software will surely improve the quality of your estimates, especially as it relates to accuracy.

The objective of using technology in estimating is to *optimize* all estimating functions. Spreadsheets accomplish only a part of this objective, while dedicated estimating software can increase the speed of takeoffs, contribute to standardized processes, leverage seasoned estimator's knowledge, enhance accuracy in all regards and allow for integration with other related information technologies.

*Estimators* remain a *key ingredient* in the success of any construction firm. Providing them with the best tools to do their jobs without hitting the proverbial "wall" is what dedicated estimating software systems deliver. It is important to start with a quality training and conversion plan to assure a successful implementation. Once implemented, dedicated, database-driven estimating software should provide benefits over spreadsheets for many years to come.