Do small firms have an advantage when it comes to Civil 3D?

by Sarah Cunningham, PE

Autodesk's Civil 3D 2008 marks the fifth release of design software created for civil engineers and surveyors. Over the past five years many good things have happened with this groundbreaking product - improved stability, increased speed and an ever-expanding set of design tools. These improvements have made Civil 3D 2008 a strong product that has significant advantages over its predecessors and its competitors.

Currently we are working with more than 500 firms at different stages in their adoption of Civil 3D. They range from firms that use it exclusively on all projects, to firms who have looked at it but haven't made any decisions yet. Our experience with this wide range of firms has shown that an overwhelming number of the smaller firms – those with less than 10 employees – have made the decision to adopt Civil 3D and have realized more benefits of this next generation design software in less time. What we're hearing from these firms is that Civil 3D is a superior product and that they'd never go back to their old software.

So, why are these small firms having so much success implementing Civil 3D? Is it luck? Are their employees exceptionally talented or devoted? We spent the last couple months asking firms we work with those very same questions. We found that success with Civil 3D comes down to three key factors:

Use Civil 3D out-of-the-box and skip extensive up-front customization

Smaller firms are more likely to start using Civil 3D as-is, straight out of the box. They'll modify their design and drafting process around Civil 3D's default configuration and settings for things like layer names, line types and colors.

By comparison, larger firms often invest considerably more time up front to tailor Civil 3D to support existing processes. The reason? Many companies with multiple offices, departments and divisions have heavily customized their current design solution to improve collaboration across the enterprise. In order

to move from one version to another or from one platform to another, they must port this customization to the new product to ensure that their work processes continue uninterrupted.

Even though we've had great success assisting larger companies to incorporate the customization necessary to allow them to integrate Civil 3D successfully into their existing processes, we believe that the advantage goes to the smaller firm who can move quickly to the new platform and can leverage the productivity gains associated with using the newest technology without incurring the expense of updating customization or reengineering processes.

Investment in foundation-level training

It's a proven fact: firms that invest in training, support, and experienced consulting will see faster success implementing technology compared to firms that don't. This holds true when it comes to implementing Civil 3D. Training in the basics is the best way to insure that production will stay at an acceptable level and it is the foundation for building advanced skills.

The firms we work with, both large and small recognize the need to provide a reasonable level of training and support to ensure their employees understand the fundamentals of Civil 3D. While larger firms typically plan and develop training and implementation budgets to get up to speed, smaller firms, with lean technology and even leaner training budgets, tend to take advantage of classroom courses at Authorized Training Centers. They rely heavily on phone support and get consulting expertise through staff augmentation on on-going projects.

One thing we will note is that, from our experience, firms that skip training altogether almost always abandon their implementation efforts within a couple of months.

Advantage again goes to the smaller firm. By taking advantage of the multitude of training and support options they can get the education they need, stay within a reasonable budget and get the newest design technology up and running faster than a larger firm.

Top down leadership makes it happen

Of the firms we talked to, what *always* keeps a Civil 3D implementation on track are principals or senior members of firms who truly believe that their businesses can realize increased efficiency, improved productivity and a competitive

advantage by using not only the newest technology but a next generation design solution like Civil 3D.

To designers and Engineers, Civil 3D, like any change in technology, represents a risk to productivity. Their focus is on completing projects on time and within budget. Principals on the other hand need to focus not only on completing projects on time and within budget but also on competitive advantage and long-term business strategies. When a principal recognizes that a new technology like Civil 3D can provide a competitive advantage and says, “We’re moving to Civil 3D and not looking back,” it sets the stage that the implementation is not optional. Combined with an investment in training, it shows they are serious about making the transition successful. And the occasional “Because the boss said so” is often enough to keep the process on track and moving forward, especially through the frustration that comes with learning and using new technology.

But these three success factors are only part of the story. A firm’s environment – the combination of technology, business strategies, clients, projects, and personalities that are unique to every firm – tells the rest. The environment has a tremendous affect on how the switch to Civil 3D happens.

To provide more insight and hopefully a confidence level on moving to Civil 3D we are publishing the first in a series of case studies that shares what works - and what doesn’t - for firms making the switch to Civil 3D.

Case Study: McNeil Engineering, LLC

Overview

McNeil Engineering, LLC is a civil engineering firm based in Leicester, Massachusetts that specializes in residential site planning and design in central Massachusetts. They regularly design mid-sized residential subdivisions of 15 lots or less and for these types of projects, McNeil's clients want to maximize the number of lots but also keep road construction costs reasonable. For McNeil, this means analyzing at least 3 or 4 different roadway, driveway, and site grading configurations for each project.

The firm's owner, Robert E. McNeil III, P.E. was confident that Civil 3D would give his growing firm a leg up on the competition but he also knew that in order to be successful, he would need an implementation plan that was lean and well organized.

Business Issues

McNeil Engineering, like most small and growing design businesses, finds it difficult to allocate potentially billable time to training. As firms cut costs and continue to keep overhead down, they pass most of those savings directly to clients. Day to day, these firms focus on keeping their backlogs full while delivering projects without missing deadlines or going over budget.

Environment

McNeil Engineering LLC was using Autodesk Land Desktop 3 when Rob decided, in early 2006, to check out the latest civil engineering design software. He believed that Land Desktop was a good tool, but realized that his firm wasn't using it to its fullest potential. His original plan was to upgrade to the newest version of Land Desktop and get some advanced-level training. But after he and two of the firm's lead designers saw a brief demonstration of Civil 3D 2006, Rob quickly changed his mind.

"The decision to invest in Civil 3D was easy for us. How could we not buy the best technology we'd ever seen? It'd be like telling my employees that they weren't worth it."

Approach

McNeil's approach to implementing Civil 3D was straightforward. They made the decision to avoid upfront customization early in the transition and were committed to adjusting their processes to take advantage of as much of Civil 3D's native capability. Another of Rob's early decisions was to make an investment in getting the firm trained in order to maximize their use of Civil 3D.

"I knew that we could've done a lot more with Land Desktop. I wanted to be sure we didn't make that same mistake with new software"

Rob was aware of the importance of beginning to use the new software as soon as training was completed. So, with a plan in place, Rob and the firm's two lead designers attended Civil 3D 2006 ATC Essentials training at our training facility in Bedford, New Hampshire.

"We knew Civil 3D was a better product than anything we'd seen before, but we were surprised by how completely different it was," admits Rob. "Civil 3D is methodical, but it takes time to get comfortable with all of the windows and dialog boxes, which are so different than the ones in Land Desktop."

They started using Civil 3D on all projects as soon as the training was complete.

"There's nothing like jumping in on a real project," said Rob, "to really master the techniques you're introduced to during class."

The firm opted to use the preconfigured standards that came with the software rather than spend time inventing new ones.

"I wanted to try and use all the tools, out-of-the-box before we started thinking about how we might improve them," said Rob.

Civil 3D in Production

McNeil's designers found that many of the Civil 3D tools –particularly ones for creating surfaces and alignments - were intuitive. When they ran into issues or situations they couldn't solve alone, they leaned on the application engineers at Microdesk via telephone support.

"Stephanie Smith, one of the firm's lead designers, was truly committed to mastering Civil 3D," said Rob, "and I believe that her commitment is a large part of why we're successful with Civil 3D today. She's thirsting to figure things out on her own, but never to the point where she's spinning her wheels on a

problem. We didn't hesitate to call Microdesk's support team for some help when we needed it."

Over time McNeil's designers developed a type of partnership with Microdesk's team of Civil 3D consultants. This type of support network proves invaluable whenever a firm adopts new technology. Through this support mechanism McNeil was able to get assistance with troubleshooting problems, getting guidance, and at times, getting in-depth explanations of advanced modeling and drafting techniques for more complex designs, such as roadway intersections and grading around retaining walls. Moreover, the relationship between the designers and the support organization expands the responsibility for the success of the implementation to everyone involved and in this situation extended to on-site visits to troubleshoot and ultimately fix some corrupted files.

"Some days, we were pretty frustrated when things just didn't work the way we wanted or expected," said Rob. "But these things happen. We never felt like we were off on our own. At the end of the day, with some assistance from Microdesk, we'd find the best solution to our problem."

Even with all the Civil 3D knowledge, experience, and support they were receiving, there were still occasions when McNeil resorted to manual drafting.

"When we first started using Civil 3D, we didn't model everything," said Rob. "We modeled things that could boost efficiency. We'd draft parcel boundaries for small subdivisions. More often than not, parcels don't get edited much on those smaller subdivisions so it wasn't worth taking the time to set them up in Civil 3D. And for drainage designs, we'd hand draft the pipes in plan and profile, since Civil 3D 2006 didn't include pipe modeling tools."

Sometimes it's a case of using good judgment and experience to decide when to model something during a project.

"I decided to model the fine grading near the beginning of a project. The model worked great but I ended up wasting time adjusting too many details that weren't really helping me make better decisions. So now, for landscaped grading between houses or in yards, I'll sketch the grading by hand and keep it that way until we're closer to the end of the project –then I'll move the finished contours into a Civil 3D surface to finalize the cut and fill calculations."

Looking Ahead

Over the course of about a year, McNeil Engineering completed well over a dozen projects, ranging from conceptual plans to definitive designs, using Civil 3D. One of the designs included a complex corridor model that controls not only the roadway grading, but also drainage ponds and retaining walls that are adjacent to the road.

To date, McNeil upgrades its software annually and plans to install Civil 3D 2008 well before the end of this year. Rob is looking forward to expanding how his firm uses the product. He's already started to use the parcel tools to create conceptual plans for a large subdivision project and he plans to use the survey tools to streamline topographic survey processes.

McNeil's upfront decisions to move to Civil 3D and use it with as little upfront customization along with their investment in training and their no turning back attitude has allowed them to become proficient with Civil 3D and is providing their firm with a competitive advantage. This is an advantage that grows as each new release of Civil 3D hits the scene. In addition, Robert McNeil is confident that the decision he made to move early has not only made him more competitive in the marketplace today but that having completed the transition now is going to save him time and money down the road.

Next steps for your firm

When small firms turn to Microdesk for advice about the implementation process, the same two questions come up: What should I do to make the transition as quick and painless as possible for my firm? How little of that can I get away with and still achieve the same quick and painless results? Here's our advice:

Make sure you have a really good support network in place.
Before installing Civil 3D, figure out how you're going to get help when you need it. When you run into problems, and you inevitably will, you'll want to have experts available that you can call at a moment's notice for support and advice.

Expect to spend a couple of months getting acclimated.
Whether you love it or not, one thing is probably true: you're really comfortable with Land Desktop or another design application. With years of accumulated resources and experience, you know exactly what to expect from your existing product. Here's an example:

Stability is always an issue with *any* software. Software developers like Autodesk do all they can to prevent them, but problems do occur. It's an annoyance with technology you know well, because you can almost predict the problem before it happens. But similar problems with new technology are much more intrusive and disruptive. A reaction like "the grading tools don't work" is common from users who lack training, experience and confidence using the software. They aren't able to predict how the software will react so they can't take appropriate measures to reduce the potential for problems.

Invest in training - it *will* pay off.

Some firms send a few employees to training classes. Others take the do-it-yourself approach by watching webcasts and reading books, blogs, whitepapers, and discussion boards. Some users are lucky enough to attend Autodesk University, the annual user conference. We've seen it over and over again: a firm's level of investment in training is directly proportional to how quickly and successfully the designers get acclimated with Civil 3D and how well they overcome and learn to prevent unexpected problems.

Get started.

By choosing to adopt now, firms have an opportunity to gain a competitive advantage. The opportunity and advantages are significant within a small firm. Choose your first Civil 3D project wisely – it should be one that is small or relatively easy. Lean on your support network - they should be able to provide good advice when picking that initial project as well as in how to get started.

Conclusion

We all know that software is never perfect. All other things being equal, most firms want software that brings the most efficiency to their design process. That's why McNeil Engineering chose Civil 3D. Successfully implementing it comes down to, not luck, but a combination of committed leadership, training and on-going support, and making good decisions about how and when to tailor Civil 3D by incorporating additional tools or standards.

These are things that every firm – regardless of its size – can use to its advantage.

If you've looked at Civil 3D in the past and found it lacking, it's time for another look. If you haven't investigated the product at all solely based on what you've heard around the industry, it's definitely time to take a close look for yourself.

A special thanks to McNeil Engineering – particularly Rob McNeil and Stephanie Smith – for their input and continued partnership.

We hope that you find this information useful and compelling. Feel free to share, post, copy, or print this paper and share it with your colleagues and staff. As always, we appreciate any feedback that you might have for us.

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Our consultants are committed to specific areas of practice, including architecture, engineering, construction, GIS, facilities/asset management, and new software development. Through 11 offices in 9 states, Microdesk's consultants provide more than just software and training for clients preparing to implement new CAD or GIS software, they focus on in-depth implementation planning and project management that aligns technology with design processes and business strategies.

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