Survival of the fittest:
3 ways successful civil engineers are adapting to changing times

"I thought I was on to something but I can't figure out how to move it."

Combine the highly competitive landscape of an uncertain economy with an explosion of new technologies and one thing is clear: the old ways of working for civil engineers—using 2D drafting tools to design and communicate—are nearing extinction. In the theory of species survival, what determines the continuation of one group over another is its ability to withstand dramatic changes in the environment. (Think animals that lived underground or in the water versus dinosaurs when the asteroids hit!)

This is not to suggest that civil engineers are not a highly evolved species. On the contrary, 47 percent of engineers recently surveyed say they have adopted modern technologies on at least a quarter of their projects, and 45 percent say this approach is helping them to win work and be more efficient.[1]

So, perhaps for the rest of you, it is time to put away the triangular scales and radius guides and let your spouse repurpose the drafting table as a mini-bar. Start with these three strategies used by successful civil engineers to come out on top.

1. **Produce better-performing designs in a fast-paced, budget-constrained environment.**
   Successful civil engineers and designers can quickly adapt to change while weighing the potential impact of their designs. A thorough evaluation of design alternatives helps project leaders determine which design provides the most benefit to the community while minimizing the impacts to adjacent property owners and the surrounding environment. Unfortunately, creating and evaluating multiple scenarios can be costly and time-consuming. Using traditional methods can take weeks and consume hours of planning and engineering resources.

After creating a model of the existing interchanges, American Structurepoint evaluated a variety of configurations and geometries to understand their effect on adjacent properties. An unexpected solution—a double-roundabout interchange—quickly emerged as the best way to meet all requirements.

Image courtesy of American Structurepoint, Inc.

[1] Source: 2012 *McGraw-Hill SmartMarket Report: The Business Value of BIM for Infrastructure*

Successful firms are using the intelligent model–based process called BIM for Infrastructure to help them evaluate alternatives faster and explore options that otherwise may not have been considered due to time constraints. Their teams can draw conceptual designs directly into a 3D environment with simple, but surprisingly powerful, sketching tools in order to evaluate many different possibilities while spending less time and money. Smarter designs mean less time spent on mundane tasks, more time spent checking the design against your objectives, and an end product that better meets the needs of the client.

2. **Find new ways to improve your firm's cost-effectiveness.**
   Investing valuable resources to create proposals can keep project managers up at night. There is no guarantee you'll win the project, and if you do, your team—using traditional methods—would have to start the design and engineering from scratch. As the project progresses, the costs can continue to add up. With 2D drafting approaches, analysis is disconnected and evaluating the impact and feasibility of decisions and changes can lead to missed deadlines and added costs.

   With an intelligent model–based approach, information remains coordinated and consistent from the conceptual phase all the way through to construction. As a result, the preliminary design can be passed to the design team without any need for information to be recreated. The potential for mistakes is minimized with dynamically linked elements and project productivity soars as multiple disciplines can work collaboratively on the coordinated model. In addition, analysis and simulation are integrated into the design process, helping civil engineers and designers more predictably evaluate project performance and have more confidence in their final design. For example, even at the earliest stages of design you can conduct roadway drainage, slope analysis, and constructability simulations that will help to reduce rework and redesign while improving your business processes.

3. **Create compelling proposals that wow clients and crush the competition.**

   Powerful visuals are a key component in creating competitive differentiation when pursuing new work. Few laypeople can easily comprehend typical 2D plan sets, but understanding is nearly universal when stakeholders can interact with an animated representation of the design in three dimensions. However, despite the benefits of 3D visualizations, many firms believe creating project proposals with 3D visuals and animations is time-consuming and disconnected from the design process. Those are the same firms that still send out 2D drawings to pricey consultants who create very pretty watercolor renderings of the project proposals; when the planning board or clients suggest a change, it's back to the drawing board—literally.

Which proposal will differentiate you from the competition?

Using BIM for Infrastructure, you can develop compelling, cost-effective visuals directly from project data at any stage of the project. Create meaningful and intuitive 3D visualizations that help clients understand project proposals. When it comes to portraying proposed reality virtually, the industry is taking cues from Hollywood to create very realistic visualizations. But more than that, civil engineering visualizations that are created directly from an intelligent model contain all of the underlying data. These animations can have all the "blockbuster" appeal visually and help facilitate more effective communications that help to win bids. With the ability to interact with, manipulate, and scale the data in real time, planners and engineers can sketch multiple scenarios (even while meeting with clients to present the proposal) and understand the potential impact of design options well before moving into design phase.

There is a new way to work that is helping civil engineers not only survive, but win. Firms are using advanced technology and 3D modeling processes, such as Building Information Modeling (BIM), to improve efficiency, increase capability, and sell their ideas. Read the McGraw Hill Business Value of BIM for Infrastructure Smart Market Report to learn more.