Sundt Construction

Customer Success Story

AutoCAD[®] Civil 3D[®] Autodesk[®] 3ds Max[®] Design

Civil 3D is helping Sundt reduce survey costs and increase our field productivity on the project. In fact, in some circumstances we estimate that for every \$1 invested in creating virtual construction models of the project, we are saving at least \$5 in construction costs.

 Eric Cylwik Modeling Engineer Sundt Construction, Inc.

Surveying Success with BIM.

Autodesk BIM solutions help untangle a highway junction in Arizona.



Model of proposed Cordes Junction interchange. Image courtesy of Vastco/Sundt, a Joint Venture.

Project Summary

Sundt Construction, Inc. (www.sundt.com) uses Autodesk® BIM solutions for the virtual design and construction of its vertical construction projects, such as office buildings, as well as its horizontal infrastructure projects, such as roads and bridges. Sundt is currently using BIM to help rebuild an outdated, complicated highway interchange in Arizona.

The \$51 million project is located about 65 miles north of Phoenix, at the junction of Interstate 17 and State Route 69. Approximately 40,000 vehicles per day use the nearly 50-year-old Cordes Junction interchange, and its current configuration mixes local and through traffic, causing frequent congestion and delays. The project will create two separate interchanges—one for through traffic and one for local traffic—and includes the construction of seven bridges and numerous new ramps, as well as realigning, widening, and paving several associated streets. Sundt and its joint venture partner on this project (Vastco, Inc.) are the project's Construction Manager at Risk (CM at Risk).

The Challenge

"The largest part of the project is the construction of the seven new bridges, and three of these bridges will be built over 'live' traffic on I-17," says Eric Cylwik, a modeling engineer for Vastco/Sundt. "Therefore, construction sequencing is critical, and the project schedule is very aggressive so there's no room for error." In addition, since the project uses the CM at Risk delivery method, the contractor is encouraged to use technical innovations during construction to help reduce the schedule and deliver a better product.

To win the job, Vastco/Sundt needed to clearly demonstrate to the Arizona Department of Transportation (ADOT) how it could keep traffic flowing while the interchange is rebuilt. Now that the job has started, efficient and accurate surveying combined with the use of automated machine guidance, is critical for keeping the project on schedule.

Autodesk[®]

Minimize survey costs and support greater field productivity.

The Solution

Vastco/Sundt used Autodesk[®] 3ds Max[®] Design software to generate visualizations that helped illustrate how its proposed construction schedule would keep traffic moving through the interchange and is now creating virtual construction models with AutoCAD[®] Civil 3D[®] software to automatically generate survey points for bridge construction and direct machinery equipment for road construction.

"For our proposal, we used 3ds Max Design software to create a model of the interchange from the engineer's design documents to generate near-photo-real visualizations of the construction phasing," says Cylwik. "This helped convince ADOT that we could keep traffic moving through the intersection—particularly under one of the bridges spanning I-17."

Now that the project is underway, Vastco/Sundt is creating virtual construction models with Civil 3D software to help drive construction. "Our models are being used directly for construction, minimizing the need to create intermediary paper based documentation for machine guidance or to waste unnecessary time in the field to establish survey control off the top of the deck," says Cylwik.

For example, typically the design team will define the bridge's elevation points at key spots along the girder. Oftentimes, those points are insufficient for construction. The field crew may need an elevation point midway between the points provided by the designer. "Without BIM, surveyors would have to "as-built", or record location information for the missing point and relay that information back to the office where, after a few hand calculations, we would determine the missing elevation data," explains Cylwik. "The end result is a lag of several hours between when the crew asks the question and gets their answer."

On this project, Vastco/Sundt is using Civil 3D to create a virtual model of the roads and the false work and top of bridge deck. "Our models of Cordes Junction help us calculate complex sloping elevations—often on a curve—in real time using survey equipment so that survey feedback is faster and doesn't take hours."

Vastco/Sundt is also making use of intelligent Civil 3D models to support its automated machine guidance operations—loading the model directly into computerized monitors on its heavy civil equipment. "This helps to save us time by eliminating the need for a survey crew to spend weeks 'blue topping' the road and also helps us deliver a quality product to ADOT with no rework."

The Result

Rebuilding the Cordes Junction interchange began last August 2011 and the project is scheduled for completion in the summer of 2013. "Civil 3D is helping Sundt reduce survey costs and increase our field productivity on the project," reports Cylwik. "In fact, in some circumstances we estimate that for every \$1 invested in creating virtual construction models of the project, we are saving at least \$5 in construction costs."





Rebuilding the Cordes Junction interchange area uses a series of virtual construction models. Imagery courtesy of Vastco/Sundt, a Joint Venture.

For more information, visit www.autodesk.com/bim.



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Eric Cylwik
Modeling Engineer
Sundt Construction, Inc.

Renderings created in 3ds Max Design of Cordes Junction construction sequencing. Image courtesy of Vastco/Sundt, a Joint Venture.

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