

Revit Structure Fulfills BIM's Promise with Improved Communication and Increased Productivity

Studies in Success

Company: Cary Kopczynski & Company, Structural Engineers (CKC)

Software on Board: Autodesk® Revit® Structure, AutoCAD®, ETABS from CSI, Computers and Structures, Inc. ADAPT-Builder from ADAPT Corporation.

Summary

Washington-based structural engineering firm and Ideate customer CKC is fulfilling the promise of Building Information Modeling (BIM) with its adoption of Autodesk Revit Structure, the BIM application for structural engineering built on the Revit platform that allows architects and engineers to work in a truly integrated manner.

The company began its adoption of Revit Structure with one grand scale project in which it utilized about 30 percent Revit and 70 percent AutoCAD. With a subsequent project, featured here, CKC took the next step to achieve 100 percent integration of Revit for production documents. That transition helped CKC turn the corner to its next three large scale projects, where the company is employing 100 percent Revit-developed family templates and a fully developed Revit standard detail library.

As CKC set out on this transition, they had specific standards in mind. They wanted to maintain the superior quality of the drawings, for which they are known, without compromise. They wanted to model all of the concrete structural components with complete accuracy. And, they wanted to model the actual sequence of construction so that the drawings and details in Revit would truly reflect the way the building would be constructed. They utilized bidirectional links between the Revit model and other engineering applications, such as the structural analysis program ETABS and post-tensioned concrete design tool ADAPT Builder.

About CKC

CKC focuses its work on multifamily residential buildings, hotels, offices, and parking structures, as well as mixed-use structures of all sizes and types. Based in Bellevue, Washington, CKC serves clients in the Pacific Northwest and along the West Coast, as well as across the United States and overseas.

CKC is well-known in its community. It was selected as one of the “Best Structural Engineering Firms To Work For” in the US in 2008 by ZweigWhite and Structural Engineer Magazine based on criteria including company culture, dedication to excellence and employee satisfaction. CKC has also received recognition from Washington Aggregates and Concrete Association, Oregon Concrete and Aggregate Producers Association, Precast/Prestressed Concrete Institute, American Concrete Institute and others for design excellence and technical superiority.

For over two decades, CKC has pioneered innovative techniques and materials that improve the constructability of concrete structures. It was only natural, then, that CKC would jump fully into Revit while others cautiously begin to implement BIM.

“We do not know of anyone else in the Northwest who has gone to full Revit documents on a project of this size,” says Mark Whiteley, PE, SE and CKC Principal. “When presenting in the Revit community, the first thing asked is how we did it.”

CKC also takes pride in keeping its clients in the information loop – from schematics to the delivery of a final set of working documents and throughout construction – in order to minimize coordination problems and maximize clear understanding.

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CKC Principal



The Challenge

According to Mark Whiteley and Justin Lopez, CKC Digital Production Team Leader, the first major CKC project as the company transitioned from AutoCAD to Revit Structure was the Bellevue Place Hyatt Expansion, a high profile project in downtown Bellevue, Washington. This 20-story hotel tower, with 509 stalls of underground parking, a 100,000-square-foot ballroom and an exhibit hall is believed to be the largest project ever done in the Northwest that involved close coordination between architects using Revit Architecture and structural engineers using Revit Structure. Autodesk published this project as a success story of the implementation of Revit Structure.

“The investment you make in time pays back quickly. In the end, our construction documents were 100% Revit.”

—Justin Lopez, Digital Production Team Leader



“With Revit, we modeled every parapet, every slab and slope as it would be built.”

The next construction project, located on Madison Street, Seattle, Washington, is a residential apartment building, about 315,000 square feet, with two levels of underground parking, 17 levels of residential space and one level of retail. The project is adjacent to Seattle's Swedish Medical Center and is intended to provide housing that enables employees and others to walk to and from the medical complex with ease. The project began in the fall of 2007 and was completed in spring of 2008. As Justin Lopez says about their transition to Revit, “The investment in time pays back quickly. In the end, our construction documents were 100% Revit.”

In CKC's earlier Hyatt Expansion experience, the model was created in Revit and the details were created in AutoCAD, an approach that, while adequate, proved bulky and slow. They became convinced that the way to go was 100 percent Revit, with every detail in Revit and no links to other drafting software.

So, for the Madison project, the goal was full integration of Revit for production documents. The CKC team wanted to model all of the structural components, all the sections, all the concrete that would be in the building. Their intention was for the model to be completely accurate. They also developed the model and drawings to reflect the construction sequence.

“The final product looked right because it was modeled the right way from the beginning.” —Justin Lopez, Digital Production Team Leader

The Solution

With both the architect and structural engineer using Revit, they could coordinate much more efficiently. The architect used the SE's model which allowed them to quickly coordinate all of the building geometry.

“The increase in the quality of the documents provides accurate details that reflect the actual geometry,” says Mark Whiteley. “With Revit, we modeled every parapet, every slab and slope as it would be built in the actual building. This helps during construction by reducing the number of RFIs and field questions.”

And as Whiteley explains, “Information is so much more accessible with a full Revit model. Everyone involved can take a look at the 3D model. As for the contractors, they can do material take-offs and identify construction sequence. All of the concrete is 100 percent modeled, and that makes it easy for everyone involved. They can link the model with estimating software and retrieve a vast amount of useful information. There is also the opportunity for enhanced coordination with the architect. In this case, we were 100 percent coordinated.”

“Throughout the design process, you are constantly manipulating the building geometry. With Revit, you easily create an image and send that to other team members as a section or a 3D view. You can present the visual information to the mechanical engineer or the architect and any conflicts are easily identified. This saves so much time that would otherwise be lost. And overall, it speeds up the process,” says Whiteley.

The company had an established standard and style for their drawings in AutoCAD. There was a level of quality they were not willing to abandon. As Whiteley explains, “With AutoCAD, there's this fear that you might lose detail correlation when tags are fixed. With Revit, they are linked. There's no fear of moving details around. You can order your documents in a clean and orderly way for a more accurate and complete presentation.”

Lopez adds “You can add 3D isometrics as you build the model, something that would take significantly more time in AutoCAD. You can show the building from different perspectives, improve the overall view including how, for example, the foundations and elevated slab integrate with the basement walls. In one view, we can actually convey the idea of three different views. At a glance, everyone can understand what they are seeing much faster and with more clarity.”

The CKC team discovered that by systematically pioneering the adoption of Revit Structure, their confidence climbed with each new level of success. According to Whiteley, “The tools were there. We just had to figure out how to use them. Every challenge we ran into, we were able to solve. And that enabled us to present the project the way we wanted. We made an investment of time and effort on this project, and the investment benefitted the next three projects.”

They were able to create enhanced production drawings for Lincoln Square Expansion in Bellevue, Washington, a 1.4 million-square-foot 34 story office tower and 41 story mixed condo-hotel tower with two levels of retail and nine levels of below grade parking (on hold at this printing), and two 400 ft. tall high rise residential apartment buildings in downtown Seattle. The company is now employing 100 percent Revit-developed project templates and continues to expand their Revit detail library. Without missing a beat, CKC has achieved its goal of 100 percent Revit documents without compromising its drawing standard, while improving communication and coordination with other design consultants and the contractor.

As a customer of Ideate, CKC found the Ideate consultants to be knowledgeable and easy to work with. CKC had the pleasure of participating on Ideate's expert panel, Starting on the Journey – Implementing Revit in your Office, a positive peer-to-peer event. CKC looks forward to participating in future Ideate community events and continuing the successful relationship.

About Ideate, Inc.

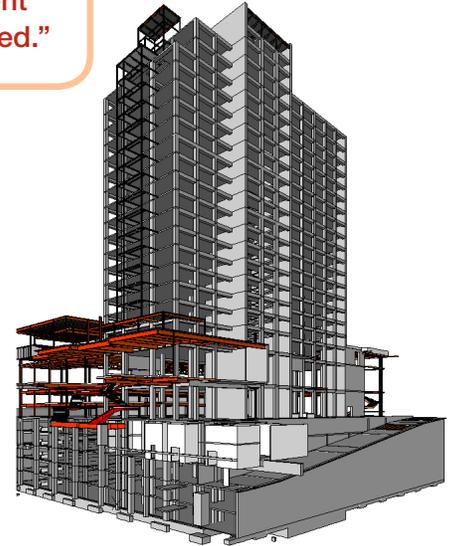
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100 percent
coordinated.”



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