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*— Roger Burlingame,
Vice President of
Technical Services at
Robertson Ceco, Corp.*



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Advanced Automation Builds Profits

Although commercial construction is not typically thought of as a high technology industry, a broad range of computer programs for design, engineering, scheduling, and visualization are important to the success of many contractor and suppliers. Software applications now contribute to shortened design cycles, reduced costs, and fewer errors.

In this highly competitive segment of the commercial building industry, fast turnaround time and minimized charge-backs are crucial to profitability. Robertson Ceco Corp. (RCC), one of the world's most profitable manufacturers of metal building systems, recently developed and implemented an intelligent, rules-based software application to automate the design-detailing phase of its pre-engineered metal buildings. Based on intelligent detailing execution software called Design++, the new system captures the knowledge of the company's most experienced design detailers and applies it to new projects. Currently deployed to more than 100 users throughout the organization, the Design++ application is credited with increasing the

company's productivity by more than 20%.

Using a proprietary analysis system that it developed internally, the company has automated the engineering of all of its buildings. However, detailing each custom configuration created a bottleneck in the workflow from engineering to fabrication. Detailing includes the drafting work involved to produce the documentation required to fabricate and erect a **mechanical** project. Complete drawings of accessories and structural members and the connectors that hold the structure together including every nut and bolt must be prepared. In 1993, the company made a long-term commitment to capture the knowledge of its most experienced designer detailers in a software application that could be deployed to all three of its subsidiaries. The company's in-house experts were tasked to define the rules and relationships of detailing and create a software application that would automate the process. The goal was to eliminate time consuming and repetitive tasks and

better meet customers' needs in less time with fewer errors.

RCC conducted a search for a system that could capture expert knowledge and apply it to architectural, engineering, and construction applications. After studying the offerings of several vendors, RCC selected Design Power to work on a pilot project using the Design++ software.

Design++ is a knowledge based design execution system that provides an object oriented development environment for capturing design principles and their relationships, as well as a platform on which to run design and engineering applications. Design++ applications use two-way links to commonly used

CAD/CAE software, such as AutoCAD, to generate 3D models, allowing users to work within a familiar interface. RCC began working with Design Power in 1994 to develop an application that it calls XDS.

The development of XDS, which stands for Expert Design System was primarily done in-house by designer-detailers from RCC's subsidiaries. Design Power consultants trained the RCC team to use Design++ software to define building parts and pieces and identify the important interdependencies of each component. The development team included users who were not software engineers but metal building detailing experts whose years of experience could be captured in the software. Using Design++, they created assembly hierarchies and design rules that automatically define the best detailing solutions for any building. XDS was designed to enable a two-way link between detailing data and the company's engineering analysis application.

The pilot project, which lasted about four months, demonstrated that complex buildings that previously took weeks could be detailed in just a few hours.

Company: Robertson Ceco Corp.
Software: Design++ from Design Power www.dp.com **Hardware:** PC's

The RCC team spent about a year-and-a-half capturing the knowledge needed for XDS. While Design Power consultants were available to provide support, it was the designers themselves who performed the technology transfer and implemented the system. The company put the tools into the hands of the people with the product knowledge. This knowledge, and the unique intellectual assets that set RCC apart from their competition, remain within the company.

"Without increasing our staff, we now complete projects in a third less time than it took before we began using Design++," says Roger Burlingame, vice president of technical services at RCC. "The XDS model is the basis for everything else that we do. It provides us with a repository of useful data including instructions for the construction crews."

Using XDS has reduced both man-hours and calendar-time to deliver new buildings. It has also significantly increased the accuracy of the parts that are delivered to a job site. Because it eliminates many human errors from the detailing process, XDS has helped reduce this type of quality expense to one-seventh of what it had been in previous years.

Today, XDS generates AutoCAD drawings, a detailed bill-of-materials, and a "cut list" for steel parts. To further increase efficiencies RCC plans to more tightly integrate the XDS system with the company's engineering analysis application. Ultimately, the Design++ engine will enable the generation of a 3D intelligent model for use throughout a project's life cycle. At the front-end, 3D renderings can be used for sales and marketing and to provide accurate cost quotes. Engineering will use the same set of data to verify calculations, and on the back-end, XDS data will provide as-built models for modifications and replacement parts in the event of building damage.

— Edited by BMS



Get the details. The Brownsville Assembly of God Church in Pensacola, FL is a custom-engineered metal building that was designed by Star Building Systems using a knowledge-based detailing system based on Design++ technology from Design Power.