

ON INTEROPERABILITY

RUBY

CONSTRUCTABILITY "When doing the pricing on a recent project, Douglas Steel Fabricating Corporation asked us to review the job to enhance constructability. It was a community college project that originally called for fully welded moment connections and knee-braced frames. The number of pieces and amount of field welding made the project uneconomical. Douglas Steel sent us the original design documents. We put together an alternative design that satisfied the intents of the owner and architect. We then transferred our CIS/2-

DAVID I. RUBY, P.E., S.E., Structural Engineer, Principal, Ruby & Associates P.C., in Farmington Hills, Michigan. Specializing in steel designs that speed and ease constructability. Recently consulted on a community college project where his design and use of Interoperability resulted in a hyper-fast and efficient design—and a six-figure rebate from the fabricator to the school.

compliant model back to Douglas Steel, enabling them to process the model in SDS/2 so they could bid both the original and alternative designs on time. Without CIS/2 Interoperability — or what used to be called Electronic Data Interchange — we couldn't have turned it around fast enough to keep the job on schedule."

VALUE "The architect's drawings, the site constraints, points of access, equipment — there are so many different things to consider to come up with the most economical product that meets a client's needs. A lot of people talk about value engineering. What that really means is examining a set of decisions that have already been made, and going from there. You're talking inside the envelope. But when you design for constructability and value, outside-the-envelope thinking leads to things like speed to market and achieving budgets. CIS/2 Interoperability is a tool that lets us think like this."

EFFICIENCY "For the community college, the floor beams were spaced at about 3-foot, center-to-center, with a very light metal deck and a reasonably thin slab. As a rough count, we eliminated over 700 members, as well as 11,000 shear studs from the floor system and it was designed so everything could be field bolted. We ended up with a metal deck system and a thicker slab that added a little dead load to the structure, but increased the strength of the composite beams. Basically, we made it easier to build, stronger and much more economical. Plus, we stayed on schedule because the design only took four days thanks to CIS/2 Interoperability."

PERSPECTIVE "Working with Fazlur Khan to design the Hancock Building early in my career gave me a different feel for construction. One thing about the Hancock: the steel out-raced concrete to the roof. In fact, steel was 25 floors ahead at one point! We even had to design temporary braces to keep the structure together because we were so far ahead. Faz was such a great concept engineer. I learned you can't just look at a building as a design — it has to be built too! Piece by piece, stability is an issue during construction. But once it's done, the issue goes away and you let the building act as it should."

COMMUNICATION "The advantage of Interoperability is speed through the elimination of paperwork and many layers of communication. Typically, a detailer

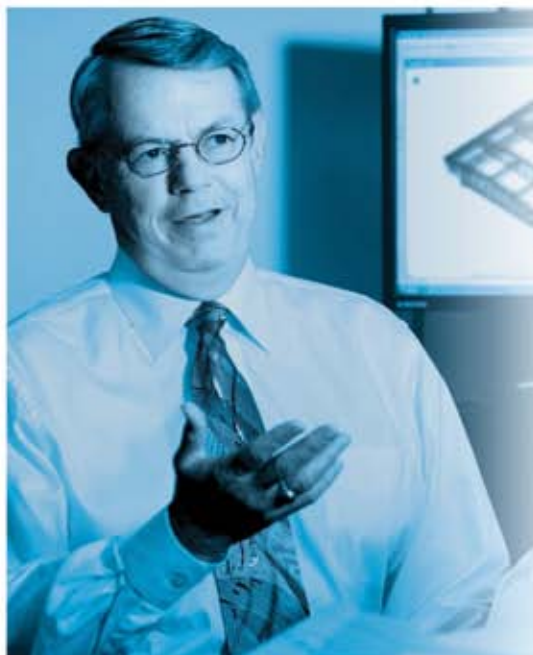
would verbalize a problem to the fabricator who would submit a request for information to the contractor who'd send it to the architect. A response from the structural engineer would be communicated through the contractor to the fabricator and ultimately, back to the detailer. And many times the detailer would respond, 'That's not the question I asked.' This happens time and time again when you're trying to explain a three-dimensional problem in 50 words or less. CIS/2 Interoperability means the pertinent decision-makers — the engineer, detailer and fabricator — can look at the model in real-time, discuss the problem and collaborate on a solution. Better, faster communication is the value of Interoperability."

INTERACTION "With Interoperability, I work with the fabricator and detailer directly. We receive their files over the Internet, pull them into our system, make comments and send them back in just a couple of hours. This saves a tremendous amount of time and keeps us on schedule. Let's say there's a connection issue, or perhaps the fabricator has a question. We're not waiting because the drawings are in the mail. They just send us their three-dimensional models and we solve the problem today. That's what Interoperability is all about."

UNIVERSAL "The files a fabricator works on are generated from the RAM model we send them. So when they pull our models into the system for detailing, they have the most current designs. There is less paperwork to keep track of and that's a significant advantage. If I send files at noon, by 3 o'clock the fabricator has his bill of materials. Manually, this process took a week. And we're not talking just 40 hours — but two or three people putting in 40 hours to pull that all together. Those extra hours are an expense completely eliminated due to Interoperability."

INTEROPERABILITY "The primary reason for Interoperability is to integrate design and construction processes by eliminating the need for manual re-entry of data. The advantage for steel is that the CIS/2 standard enables compliant software—Tekla, SDS/2, Bentley, RAM, FabTrol and others—to exchange data electronically with accuracy and speed. In fact, CIS/2 makes most structural steel design, detailing and manufacturing applications interoperable."

STEEL "Steel already gave us a much quicker delivery time. And that's now clearly enhanced by CIS/2 Interoperability. Steel lets me build a structure that can be modified, easily reinforced, adapted to another use and has overall economy from start to finish. Unless you're building sidewalks, there's never a reason not to use steel."



***INTEROPERABILITY** is the ability to manage and communicate electronic product and project data between collaborating firms. It allows the exchange and management of electronic information, where individuals and systems are able to identify, access, and integrate information across multiple systems. The goal of interoperability is to create greater efficiencies by eliminating the manual reentry of data, duplication of business functions, and the continued reliance on paper-based information management systems. The steel design and construction industry uses the CIMSteel (CIS/2) neutral file format to enable interoperability.*



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