

# ON STEEL

Swanson

**AESTHETICS** Steel offers a great deal of flexibility and design opportunities in exposed areas where the architect is looking to use the structure as a design feature. Steel allows the architect more creative possibilities for visual interest than concrete. Something as simple as bolt patterns can present a design statement.

*James Swanson, SE, PE. Principal. Halvorson Kaye Structural Engineers. Jim has been engineering complex buildings for over 18 years, using steel. He believes steel doesn't impose unnecessary restrictions on architectural design – something his clients appreciate, and something that has made his firm sought after by leading architects throughout the world.*

Steel beams are higher strength and have longer span capabilities than concrete. In a large open space, trusses or other lattice framing can appear transparent. Nothing blocks the sight lines.

**SCHEDULE** In today's market, the typical design phase is squeezed down because of the economics of the project. Engineers generally have to design in tandem with architects as the project evolves. This requires flexibility to accommodate design revisions, and steel makes that easier. With steel buildings, HK engineers can make significant framing revisions very quickly, and still meet tight deadlines.

**COLLABORATION** The relationship between engineers and steel fabricators should not be overlooked. Experienced fabricators bring a wealth of knowledge to the table. On the Hyatt Center, some of the more complicated steel components are heavy built-up box columns. Early on in the detailing process I met with welders to review alternatives to make fit-up in the field fool proof. Building in these measures ahead of time will eliminate a lot of potential field problems.

**QUALITY CONTROL** With a steel building, the complex construction work really takes place during the detailing and fabrication process under controlled conditions. That's comforting from an engineer's point of view, in that all of this work occurs under the watchful eyes of the shop inspectors. The work pace at the site can get intense, which may lead to errors. There's quite a bit of field measuring necessary with concrete buildings. Whereas with steel, it's cut to fit in the shop, shipped to the site and erected, and for the most part it fits precisely.

**COMPUTERIZATION** The computerized technology used by steel fabricators today is incredible. They can create virtually any geometric shape efficiently, with very little cost premium, especially where there is repetition involved. This creates unlimited opportunities for engineers and architects to "sculpt" steel members to suit the design concept.

**DETAILS** I do spend time reviewing connection details, particularly typical ones that can be repeated over and over throughout the project. A simple change in a bolt or weld detail can have a big schedule and cost impact. AISC provides engineers with a lot of guidance in selecting appropriate details, particularly with many of their publications now available. It makes our work easier, and results in a more economical structure.

**SECURITY** The Hyatt Center is one of the first significant office buildings in Chicago designed post 9/11. It includes state of the art security equipment and blast protection designs. These concepts for office buildings were not even considered several years ago. Engineers now are incorporating blast walls, curbside barriers and structural redundancies into standard design. What was critical in the design of the Hyatt Center was the ability to accommodate these upgrades into a steel structure without imposing aesthetic or functional restrictions on the building.

**LONG SPANS** One of the first critical design issues I review on a project with developers and architects are the beam spans from column to column. Long spans with shallow beam depths are always desirable. That's where steel has the advantage. Typical Chicago office lease spans are over 40 feet. No other material can frame that distance as economically as steel. This becomes even more critical on taller buildings. A concrete framed building can easily weigh twice as much as a steel building. The foundation savings alone are dramatic.



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