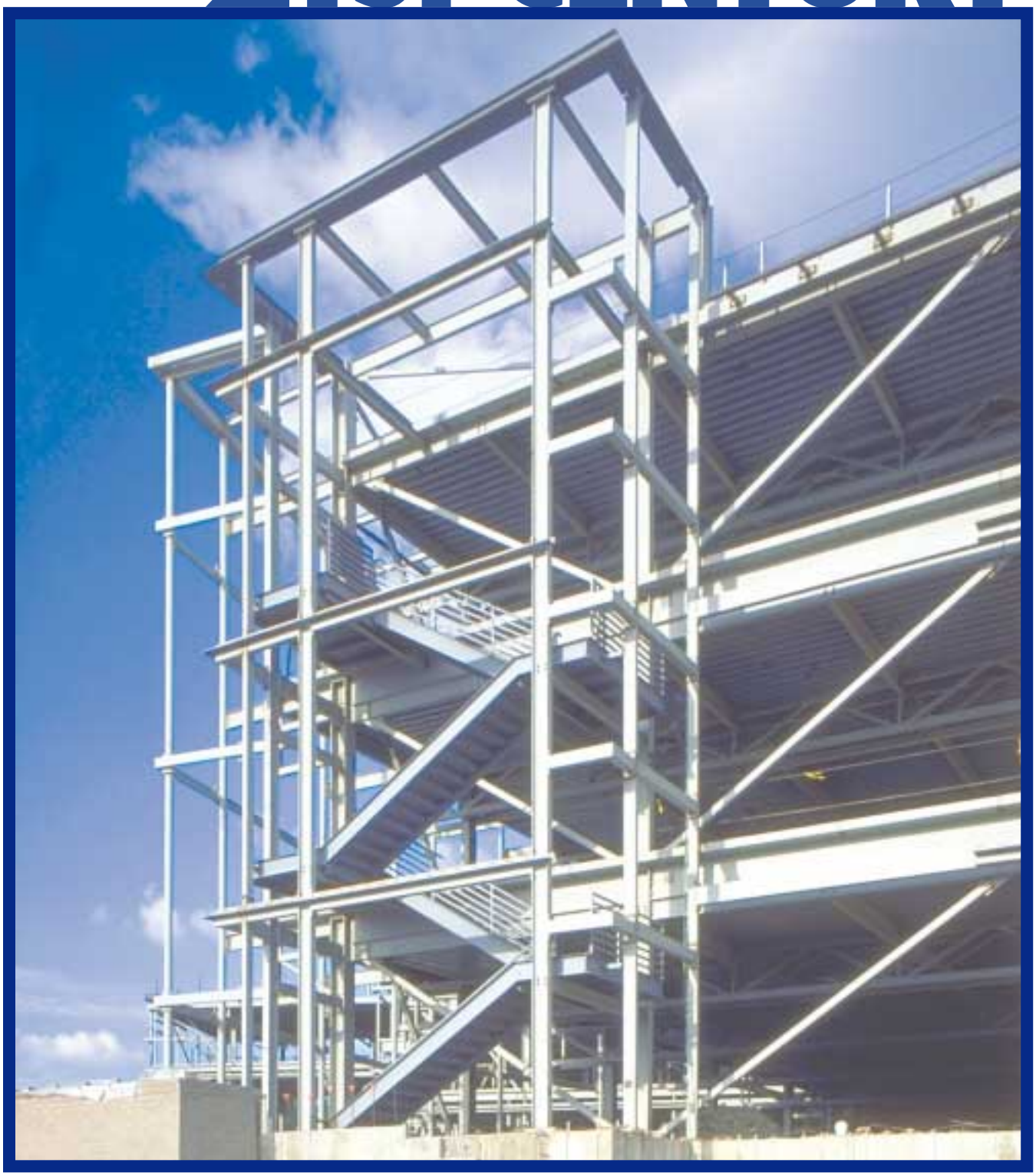
HSS: DESIGNS FOR THE 21st CENTURY



ADC Telecommunications World Headquarters

TORSIONAL STABILITY AND AESTHETICS MAKE HSS A 'NATURAL' FOR ADC'S WORKPLACE OF THE FUTURE

When ADC Telecommunications, Inc. began planning its new world headquarters outside of Minneapolis, it wanted the complex to reflect the company's culture and position of leadership in the industry to visitors from all over the globe. And, for its own staff, it wanted to set a standard for the workplace of the future.

The complex is located on a 93-acre site in suburban Eden Prairie and ultimately will contain about 1.2 million square feet of structures housing corporate offices, an auditorium, training center and research and development facilities. The project's first phase—two buildings and auditorium comprising 500,000 square feet—is now in use. A second phase has been designed, and others will be added in the future.

Showcase for Use of Exposed HSS

The complex, designed by HGA Architects of Minneapolis, creates a work environment that is people-friendly and promotes the concept of teamwork. The facility is a showcase for the use of steel Hollow Structural Sections (HSS), virtually all of it exposed.

"One of the most desirable assets you have in creating a comfortable workplace is natural light," says Manos Ginis, a Principal and Senior Designer of HGA. "That inspired many of our design decisions."

Ginis says that the building has higher-than-normal ceilings and windows to maximize the amount of natural light that can enter from all sides. Several interior atriums allow additional penetration of light."

Noting the design also emphasizes the value of teamwork, Ginis says, "Today companies sell systems as well as products. That type of business requires the collaboration of many different people and disciplines. So the environment has to work collaboratively."

Atriums Provide Vertical Integration

That concept is promoted by the 60' high interior atriums and a number of "edge" atriums around the buildings' perimeters. These integrate the structures vertically and allow employees to be aware of their fellow employees on other floors.

"We also wanted to create an environment that acknowledges how systems are put together," Ginis adds. "In this case we meant building systems, so virtually everything is exposed—wires, conduit, ductwork, mechanical systems, sprinkler systems and others."

Systems aren't the only things exposed to view. "There's virtually nothing that's covered," Ginis says. "Every weld, every connection, all the steel, everything's out where it can be seen, We see that as an essential part, not just of the design,

but of the perception and definition of spaces in the buildings."

Mark Hoel, HGA's Associate Vice President and Structural Engineer of Record for the ADC complex, details the advantages that led to the extensive use of HSS.

Torsional Stability a Major Advantage

"We frequently use HSS because of its exceptional torsional stability," he says. "That's the product's greatest structural advantage, but not its only one. When you use HSS in columns, you can usually use smaller sections that fit more neatly into a wall than other structurals do. For things like stair stringers, HSS has nice, flat surfaces that make connections easier. And aesthetically, it can make a contribution to outstanding designs."

Hoel says the most prominent use of HSS is in the trusses that support each floor of the building. Trusses are paired at every column line, which are located 25 feet apart. "Because they need to cantilever six-to-eight feet beyond the columns, we placed a truss on each side of the column," he explains.

The top and bottom chords of each truss were 6" square HSS, with 3/8" walls. Vertical and diagonal web members are 5" and 4" square and 5" x 3" rectangular HSS. Trusses were all shop welded, in most cases using fillet welds. They were then bolted to columns using matching plates welded to columns and trusses.

On exterior walls, 12" x 6" rectangular HSS was hung from the end of trusses to support the buildings' brick and glass façade. "The torsional properties of HSS made it the logical choice for this application," Hoel says. "The brick comes in at about 8" of eccentricity, so we needed the torsional rigidity to keep the walls straight."

Round HSS Supports Glass Curtain Walls

The numerous 60' tall edge atria on the buildings' perimeters used 6-5/8" round HSS columns, 3/8" walls, to support the glass curtain walls horizontally against wind pressures. The columns were connected by sections of 8" x 4" rectangular HSS.

HSS was also used for the building's core atrium stair stringers and handrails, and in entrance canopies, where their closed tubular shape keeps out moisture and contributes to the buildings' pleasing appearance.

According to Lejeune Steel Company of Minneapolis, steel fabricator for the project, Phase 1 of the ADC complex uses roughly 10,000 pieces of HSS—an amount that end-to-end would stretch 16 miles—weighing 840 tons. While ceiling trusses were shop-welded, most field connections were made with bolts to speed the erection process, although some of these were later welded for structural strength purposes.