

## CAD IN PRACTICE PROFILE: POLSHEK PARTNERSHIP ARCHITECTS LLP

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Since the advent of computers for architecture, James Stewart Polshek, FAIA, founding partner of Polshek Partnership Architects LLP, has insisted that his firm's technology standards match the same high level they maintain for their award-winning designs. As explained by Senior Associate Don Weinreich, AIA, this objective translates into computing priorities that differ significantly from those of the average firm. Weinreich observes that many "typical" firms use computer technology for profitability first, consistency of documentation second, and enhancement of the design process last. At Polshek Partnership these priorities are reversed. Supporting and enriching the design process is the overriding objective of all computing activity at the firm. Consistency of documentation, as a second-level priority, is pursued not just for routine coordination and quality control, but in a proactive effort to maintain control over every detail in the process of communicating design intent—in other words, to further support design. The potential to increase profitability through computerization (e.g., by doing the same work in less time) ranks low among the computing priorities at Polshek Partnership. According to Weinreich, "the guiding principle is to do no harm," that is, to exploit the maximum potential of computers to support the design process without incurring additional net costs. In effect, the firm is taking the time and effort that computerization can save on many routine, procedural tasks and reinvesting those savings in additional design studies and details. This approach to computers for design is consistent with that of other AIA Firm Award-winning practices profiled in this series. (1)(2)

New York City-based Polshek Partnership's emphasis on the design benefits of computer technology started with the firm's first two CAD workstations in 1988. That was a time when less than one quarter of architecture firms had any computer capability at all, and most of the then-computerized firms were focused on using the technology to crank out construction documents (CDs). Many firms with serious design aspirations resisted CAD altogether, arguing that they could not benefit "because we don't do repetitive work." Polshek chose DataCAD for DOS (on stand-alone Intel 386-based PCs) specifically for "non-repetitive" 3D design work—not for CDs. The firm's first CAD project, with final CDs comprising a mixture of DataCAD-based and hand drafting, was the Inventors' Hall of Fame in Akron, Ohio (since completed, this project was recently recognized by the AIA Honor Awards for Design jury).

From the late 1980s until the mid-1990s, the firm added workstations at a steady pace, until there was a CAD-capable computer at every architect's board. Even though these computers had been connected via a Novell NetWare network for efficient file sharing, by 1995 the firm's larger projects had begun to outgrow the file-handling capabilities then available in DataCAD for DOS. Weinreich explains "we had some very large museum projects that really required reference

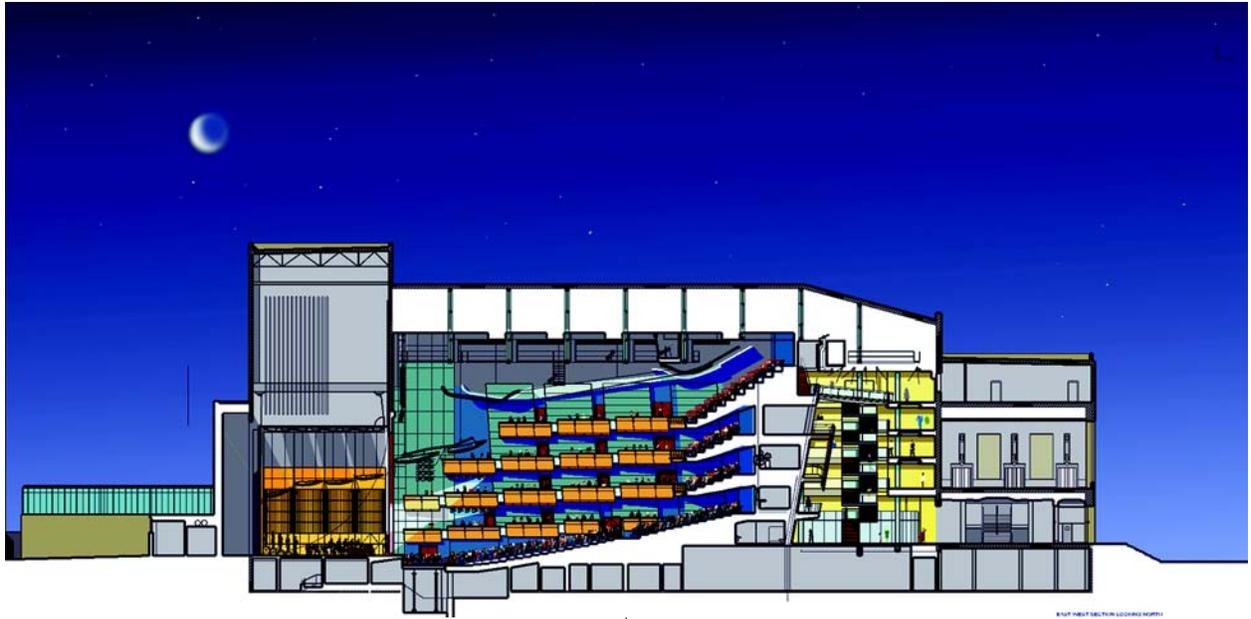
file capability to break the project into more manageable file sizes. We also wanted better DWG-file compatibility to support document exchanges with consultants and with associated architects, many of whom had started using AutoCAD" (with its native DWG format).

For those reasons AutoCAD might have seemed an obvious choice, but after months of careful study and evaluation of all alternatives the firm chose Microstation from Bentley Systems as its new CAD platform. Consistent with Polshek's overall philosophy about computers as design tools, the deciding factors centered on design and presentation issues. Weinreich recalls "the issues included things like color-bit depth and flexibility." The limitations of the AutoCAD color palette that was available at the time proved unacceptable for the lighting and material studies the firm's design staff had in mind.

In 1995 the firm switched to Microstation5, and has consistently upgraded through Microstation95 and MicrostationSE. According to current CAD Manager Tom Felcone, the firm is evaluating the latest version of Microstation/J for a late-'99 rollout that also will include Microstation TriForma for Architecture—Bentley Systems' 3D, object-oriented, architectural plug-in to Microstation/J. As of May 1999 Polshek maintained 38 seats of MicrostationSE, one of Microstation Modeler, and eight of TriForma (running as an add-on to SE). Because of the "extremely enthusiastic reaction of architects in the studio to TriForma's integrated modeling capabilities," Felcone anticipates that all 47 CAD seats "will move to the J/TriForma combination by year end." Because Polshek Partnership is a Bentley Select subscriber, Felcone will be able to "slipstream" the upgrade rather than resort to the more disruptive "forklift" upgrade required by many other software packages.

A previous CAD manager had successfully established a system of custom seed files and color tables that were locked in to ensure consistency of drawing set up. This system extended to the maintenance of graphic standards and macros, with a configuration setup that is uniform for all stations. By creating default templates with default reference file paths back to the server, each user configuration could be locked down to spare users the chore of configuring their own drawing setups. However, customization was always an available option, especially for presentation drawings of the type that the firm does for design competitions. Felcone retained most of this system, but moved many MDL functions (Microstation's internal language) out to the workstations for speedier performance, cutting the time to perform some larger operations from 80 seconds down to 35 (a nearly 70% improvement).

The trade-off in running more CAD functions locally is that any upgrades to setups must now be installed at each station, rather than just once at the server. Felcone anticipates that this chore will be eased on his next round of upgrades because he will be able to upgrade stations remotely via Microsoft System Management Server (SMS), part of the firm's recent upgrade to Windows NT4.0 installed by Network Administrator Sal DeAugustino. On joining the firm in October 1998 DeAugustino recognized an immediate need to enhance Polshek Partnership's network infrastructure. Ca-

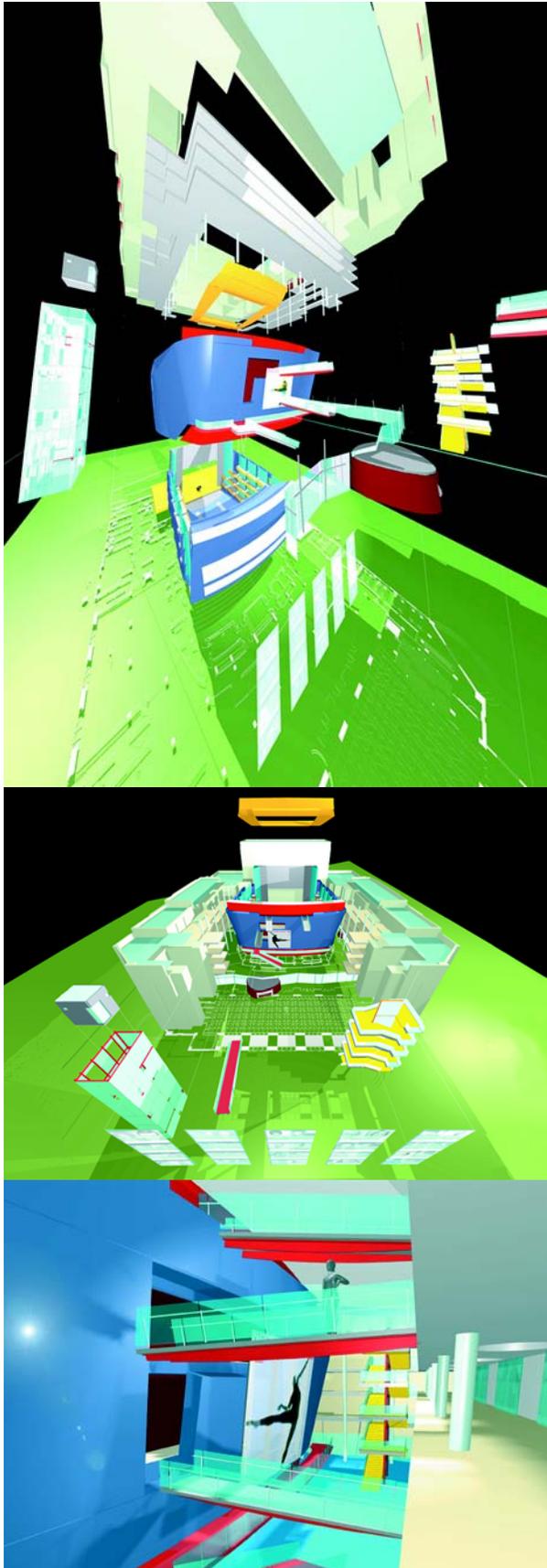


WEST ELEVATION LOOKING NORTH



NORTH-SOUTH SECTION LOOKING EAST: LOBBY


**OKLAHOMA CITY Civic Center Music Hall**  
 Richard R. Brown Associates AIA IN ASSOCIATION WITH Poishek and Partners Architects LLP



bling was upgraded to Category 5; and 100BaseT switches, providing a fifty-fold increase in the bandwidth available at a typical desktop, replaced the previous 10BaseT hubs. DeAugustino replaced the Windows 3.11 and 95 desktop client software with NT4.0 Workstation, and replaced NetWare4.1 with NT4.0 on the server side. Server storage capacity, which had become severely stressed, was nearly doubled, to 52GB. This is backed up daily to 4mm DAT tape, with weekly rotation off-site. Completed projects are archived off to CD-ROM. DeAugustino, emphasizing the firm's need for uptime and reliability, does not anticipate upgrading to Windows2000 "until after the second or third service pack is released."

CAD PCs acquired at Polshek Partnership today typically are PentiumII/400s with 128MB of RAM, over one hundred times the processing power and memory capacity of the firm's original PCs eleven years ago. At the same time as the recent network upgrades, the firm converted all its desktop PCs from cc:Mail, Netscape Navigator, and WordPerfect to Microsoft Exchange/Outlook98, Internet Explorer, and Word. CAD Manager Felcone notes that the calendaring and scheduling functions of Outlook98 have proven especially popular, because available meeting times of associates and partners constitute one of the most critical resources in a successful design firm. A majority of the firm's architects prepare their own correspondence and memos directly in Word, relying on firm-wide templates. Other software includes Microsoft XL and Access, which designers are starting to use in conjunction with Microstation to generate door and finish schedules. Polshek Partnership's project accounting and billing runs on Semaphore, Inc.'s eponymous software.

Even with all this technology, the overriding criterion in all hiring remains design talent. Weinreich says the firm "looks for talented designers who are capable of learning the computer, and who are able to use it as a tool." It is then up to the CAD manager to assess new hires' computer skills and bring them up to speed. This development process is helped along by a project team system in which every project has "a designated person to provide frontline CAD support to the team."

As is the case with a number of other high-profile design firms, Polshek Partnership is moving cautiously into Internet technology. While everyone from Associate level up has Web access from their desktops, and Felcone and DeAugustino are starting to build an intranet, the firm does not yet have a public Web site or any project extranet sites. In part, this is attributable to the firm's philosophy of applying technology only where it enhances the design process; and in part it is attributable to Managing Partner Joseph Linden Fleischer, FAIA's considered judgment that project Web site technology presently is too immature and too insecure for the sort of high-profile projects the firm typically undertakes.

Although Polshek Partnership is widely known for a long track record of museum and performing arts center designs, there is no signature "Polshek style." This is especially true in the firm's recent work involving the insertion of radically new programmatic and design elements within the context of existing building shells—as in the renovation and expansion of New York City's Museum of Natural History and Hayden

Planetarium, and in the renovation of the Oklahoma City Civic Center Music Hall.

The latter project, as described by Susan Strauss of Polshek Partnership, "converts a 1938 Moderne civic building into a 2500-seat, acoustically ideal "shoe box" theater for the Oklahoma City Philharmonic Orchestra. The project allows the Music Hall to function as a full proscenium theater (figure 1, center), incorporating variable acoustics, with fly tower, wings and backstage facilities (figure 1, left). This project invents an entirely new architecture that is embedded within the old and interacts with the original in unexpected ways. The volume of the new audience chamber is pulled away from the existing structure (figure 2) and molded into a dynamic form expressive of the performances within (figures 3 and 4). The new theater is connected to the old fabric through a series of circulation elements spanning the interstitial void (figure 5). Stairs, elevators, ramps, and bridges are interspersed through this vast space (figure 6), creating an exhilarating spatial transformation as one moves from the street through the lobby and atrium to the more mysterious volume of the theater. This journey of discovery into a magnificent and electric space becomes a theatrical event that will be inextricably linked to the cultural life of Oklahoma City."

## Credits

**Images:** MicrostationSE color fill over line drawings for plans and sections; MicrostationSE 3D model renderings with additional manipulation in PhotoShop for all 3D images.

**Project:** Polshek Partnership's Principal in Charge: Timothy P. Hartung, FAIA;

Design Principal: Richard M. Olcott, FAIA

Architect of Record: Richard R. Brown Associates, Richard Brown, Principal in Charge

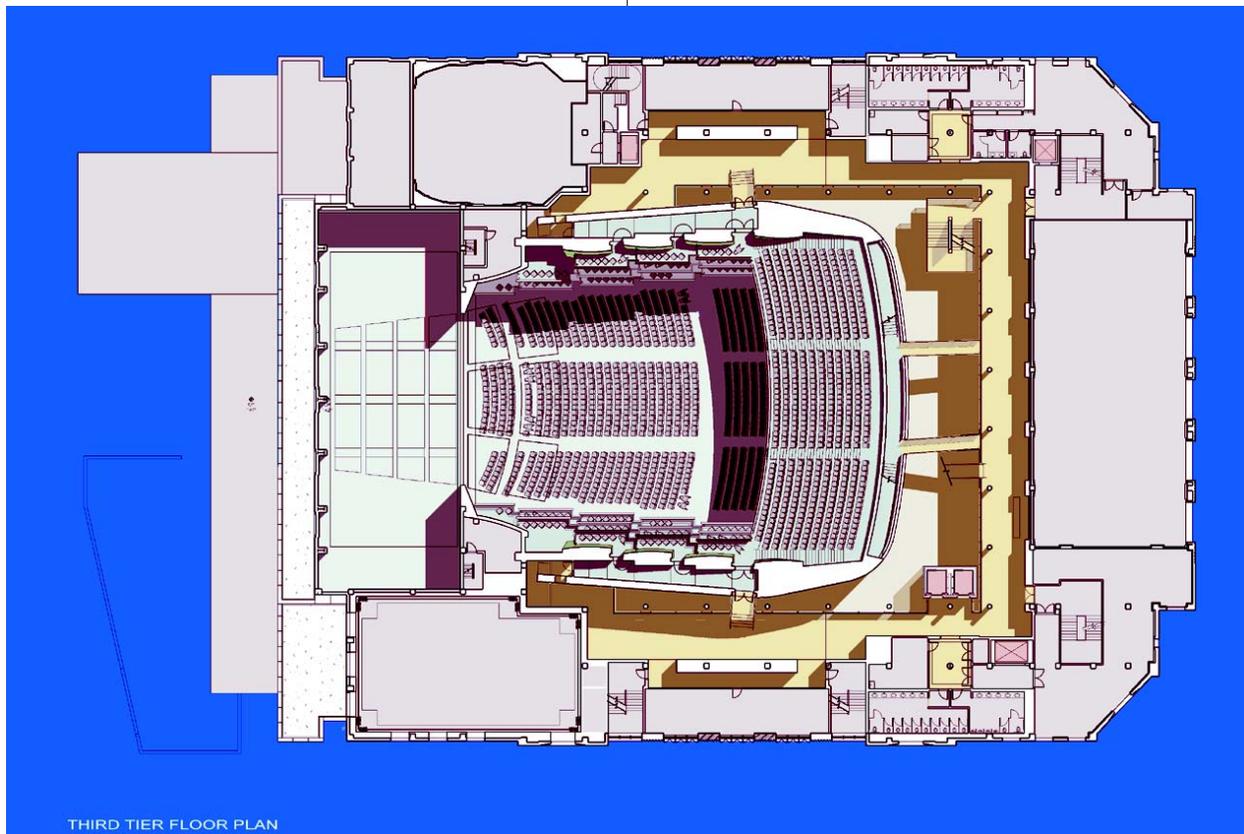
Date of Completion: September 2000

## Notes

(1) Laiserin, Jerry. "Information Technology and Architectural Practice: The State of the Art." *ACADIA Quarterly*. Summer 1996. pp. 13–19.

(2) Laiserin, Jerry. "CAD in Practice Profile: R. M. Kliment & Frances Halsband." *ACADIA Quarterly*. Winter 1999. pp. 14–16.

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**Structural Systems**

- Trusses
- Stability & Determinacy
- Truss type
- Truss Analysis
- Ideal Truss
- Method of Joints
- Method of Sections
- Zero-Force Members
- Preliminary Truss Design

Trusses, Arches, Columns, Frames, Cables, Beams, Continuous, Surfaces

Examp M Q Architects Concepts Systems

**Basic Concepts**

- Members in Bending
- Beam Types
- Statically Determinate
- Cantilevered Beams
- Beam Stresses
- Load Effect on Building
- Shear and Moment

Systems Overview, Static Principles, Structure Loads, Structural Analysis, Structural Materials, Strength of Materials, Structural Connections, Structure & Form

Horizontal Shear

Vertical Shear

Column Buckling

Examp M Q Architects Concepts Systems

Overturn

Torsion

Load Distribution in a Frame

Rigid Frame Response to Uniform Loading

Column Buckling