EAE

Merit Award

S.T. Dana Courtyard Infill

Ann Arbor, MI

Juror Comment

"A subtle architectural solution to enclose the central atrium has been elegantly achieved using simple structural steel detailing."

The University of Michigan's School of Natural Resources and Environment has a greatly expanded and newly refurbished home tucked behind its 1903 stone façade. The 11,000-sq.-ft expansion was accomplished entirely from within, by placing a series of mezzanines in an abandoned central courtyard and reclaiming the attic space that surrounded it. A new skylit roof encloses the entire structure, permitting daylight to enter courtyard-facing rooms as it has for 100 years. All this was accomplished while the building remained occupied, by using an innovative steel frame that extends up through the courtyard and covers the building like an umbrella.

The Samuel Trask Dana Building was built on the University of Michigan's Central Campus Diag as a medical school facility and has been home to the School of Natural Resources and Environment since 1961. The project was fast-tracked meet school-year scheduling requirements, and also focused on the responsible use of resources through the entire renovation.

The new steel frame permits the existing masonry bearing walls and foundations to carry their originally intended loads. The client required a frame that supported a massive skylight and left the existing building roof intact until the new roof was installed. The chosen aesthetic was a graceful framing system with exposed trusses that evoked iron-framed structures of the past. This frame was to rest on a series of courtyard columns, which, for both functional and aesthetic reasons, were not symmetrical about the axis of the courtyard.

In order to address issues of spatial aesthetics and plan asymmetry, SDI designed a truss with an arcing interior web. This evokes a traditional end-bearing gable truss, but in fact is a center-bearing truss which cantilevers outward from its bearing points in each direction. The cantilevering trusses form the "umbrella" which covers the courtyard footprint and beyond. In order to accommodate the asymmetry of the columns, short transfer beams were placed below pairs of truss panel points as a means of transferring forces from the

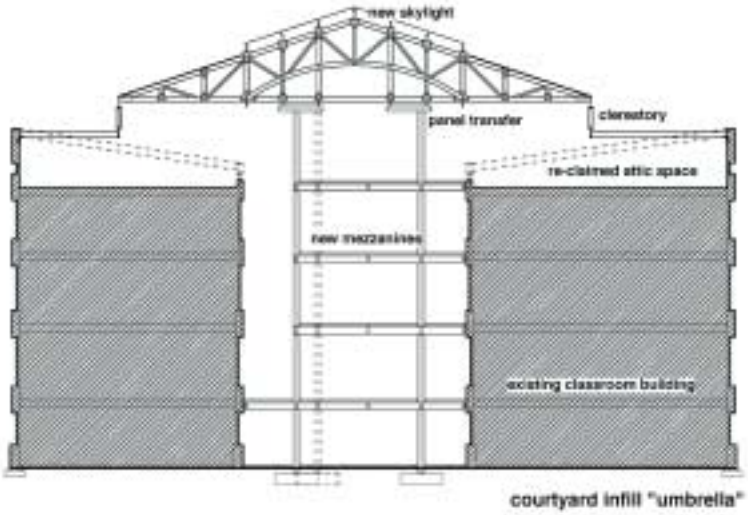
Owner
University of Michigan, School of Natural Resources and Environment
Dana Building, Ann Arbor, MI

Structural Engineer
Structural Design Incorporated, Ann Arbor, MI

Architect
Phase I: University of Michigan, Architectural & Engineering Services, Ann Arbor, MI
Phase II: Quinn Evans, Washington, DC;
William McDonough & Partner, Washington, DC

Steel Fabricator, Detailer & Erector
Cadillac Iron, Inc., Oxford, MI (AISC member)

Structural Engineering Software
Multiframe3D



very regular truss geometry to the irregular column geometry below.

Suspended from the perimeter of the umbrella is a series of Vierendeel trusses which transfer lateral forces from a high roof to a low roof and create a clerestory window. All lateral forces in the roof are ultimately transferred as shear forces into the exterior parapets of the building, which were investigated to establish their capacity to resist the new lateral forces. No bearing walls or footings experience an increase in gravity loading. All new gravity loads are carried back to the "umbrella." ★