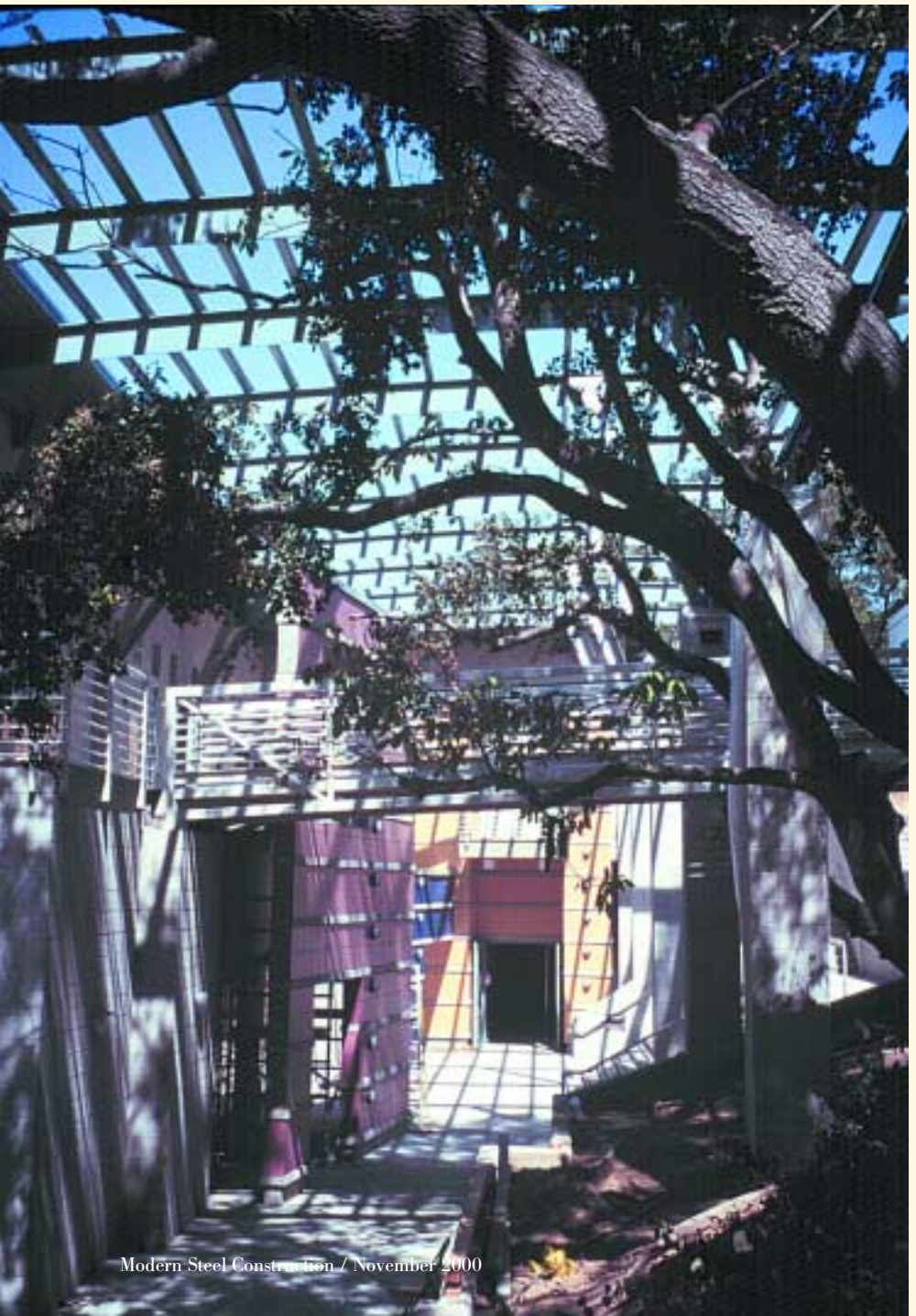
Arts Center Embraces *Nature*

By David C. Martin, FAIA and Onik Tahtakran, S.E.



Flintridge Preparatory School, a private high school with strong programs in the performing arts, needed a new performing arts complex that would serve as a unifying landmark structure for the entire campus. A steep slope divides the wooded six-acre campus into upper and lower plateaus. Located at the end of the primary internal pedestrian street, the new two-story Performing Arts Center connects the two levels of the campus. An 80-seat black box theater, a music rehearsal room, a dance studio and a few classrooms fit compactly into the 10,000-sq. ft. Center. The building's signature feature is an open-air steel trellis, which provides definition and filtered shade for an outdoor plaza, and creates a graceful connection to nearby trees.

The structural system is reinforced concrete block, appropriate for a performing arts center due to its acoustic properties. The light-colored concrete also harmonizes with existing campus buildings. For the roof, wood at first seemed to be the obvious choice to tie the structure into the landscape. However, timber was ruled out because of its weight and size and because of fire protection issues. Steel, on the other hand, is light and could form a curve, creating an airy feeling more appropriate for the natural setting. In addition, the steel could be ordered early and bolted connections could be used, so construction could proceed much faster than with precast concrete or poured-in-place concrete.

Previously, the school had no central gathering space. The new building forms an L around a stepped plaza that rises with the slope of the hill. Stairs and seating ledges make this an intimate amphitheater for rehearsals, small or impromptu performances and socializing. To activate the space, the building's circulation is located on the exterior, creating a lively "street" and "piazza." Each of the performing arts disciplines has its own door, its own

"storefront" on this miniature theater district. Light fixtures running up the walls contribute to this concept.

The blue-gray steel trellis extends the curve of the roof structure and provides a sense of enclosure for the plaza. Its design emulates the natural canopy of leaves provided by the nearby grove of oak trees. In addition to mitigating the hot sun of the Pasadena foothills, the trellis can double as an armature for theatrical lighting, banners, signs and stage sets. A visitor walks through the grove at the upper level of the campus and is drawn to the performing arts building by the large canopy that refers to the forms of the surrounding landscape.

Structural steel is an excellent material for the roof and the exposed structural trellis. While the roof's main members are W18×35, a more elegant looking steel was used for the trellis—S18×54.7. These exposed steel shapes were curved, and the bottom flange was removed to achieve the desired aesthetic. The thinner trellis pieces are S6×17.25, with the bottom flange left in place. Connections are bolted with limited field welding.

The supports for the trellis also draw their inspiration from the nearby tree branches. CMU columns are topped with semi-circle plates. From these plates, four S10×35 steel members, with the bottom flange removed, branch out at angles to connect to the trellis.

Although the roof and trellis may look like one continuous arc, the interior roof structure requires larger members to carry the loads. The joint between the trellis and the roof structures is at the face of the building. The trellis members are tied laterally into the main body of the building in order to spread the burden of carrying seismic and wind loads. The roof and trellis act as integrated structure.

South elevation showing trellis structure and roof.

For this project, it was essential that the architect and engineer sit together at the computer and collaborate. To visualize the way the trellis would curve and how the branch supports would meet the column, Form Z was used to model the building in three dimensions. Working together from the beginning allowed us to come up with a simple and cost effective solution. The flexibility and elegance of steel helped us achieve our desire to extend the beauty of the site and create a new environment that would foster a sense of campus community.

David C. Martin, FAIA, co-chairman and design partner, and Onik Tahtakran, S.E., director of structural engineering, both serve with AC Martin Partners, Los Angeles, CA.

Owner: Flintridge Preparatory School, La Canada Flintridge, CA

Architect and Structural Engineer: AC Martin Partners, Los Angeles, CA

Contractor: Dumark Corporation, Placentia, CA

Software: Modeling, Form Z; Design, MicroStation

Trellis detail.