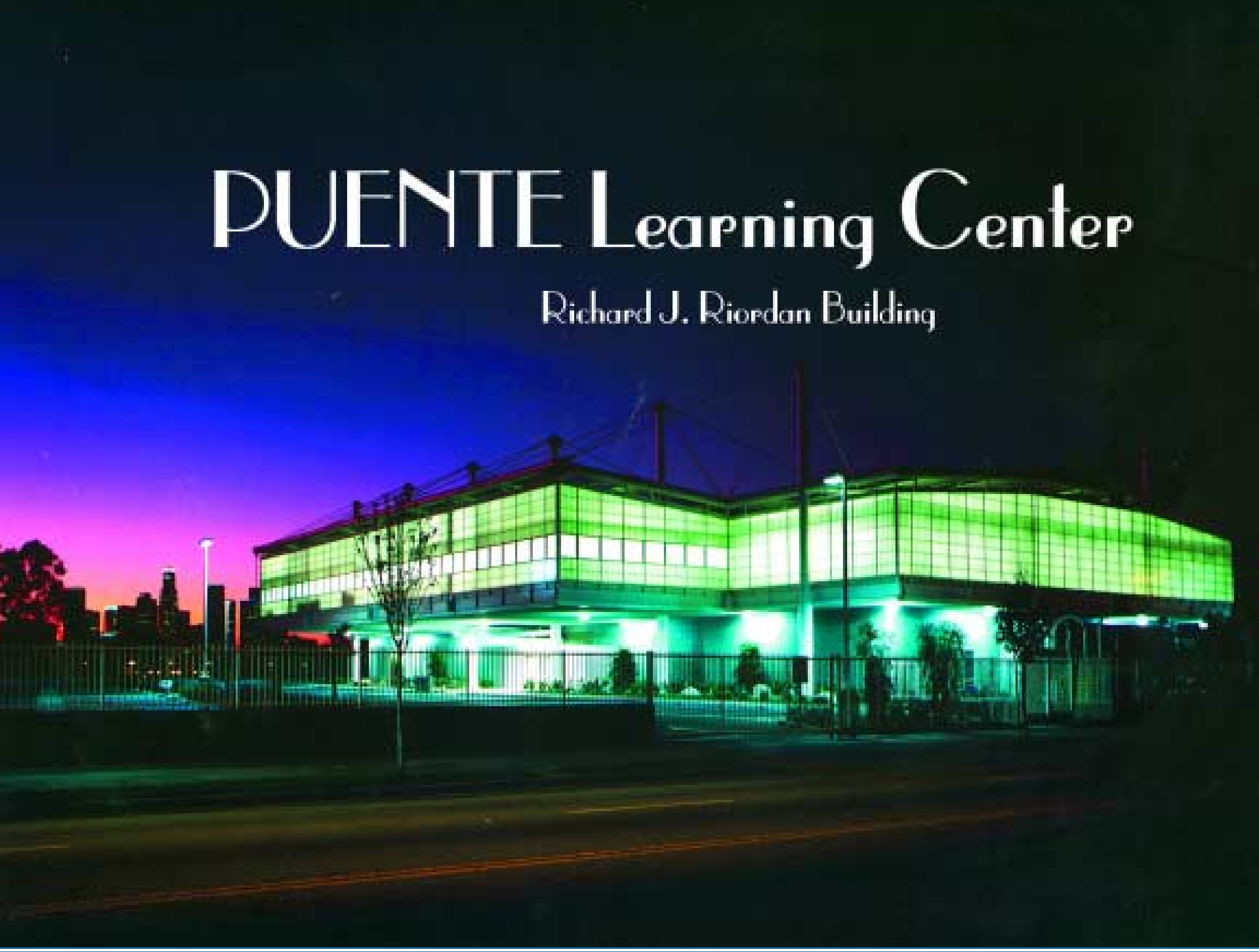
PUENTE Learning Center

Richard J. Riordan Building



Engineering Awards of Excellence

Regional Winner

In the midst of a once riot-torn neighborhood, the PUENTE Learning Center is a beacon of hope for both teens and adults. The center, a nonprofit, nonsectarian education group run by People United to Enrich the Neighborhood through Education, now serves more than 1,600 students a day, providing basic education, job training, English as a second language, child preparedness and assistance to at-risk high school students.

In designing the center, the goal was to build a 40,000-sq.-ft. educational facility on two acres of land donated by Richard J. Riordan, then a business leader and philanthropist and now mayor of Los Angeles. Flexibility to accommodate changing hardware technology, low maintenance requirements and the need to provide adequate on-site parking were all important design considerations.

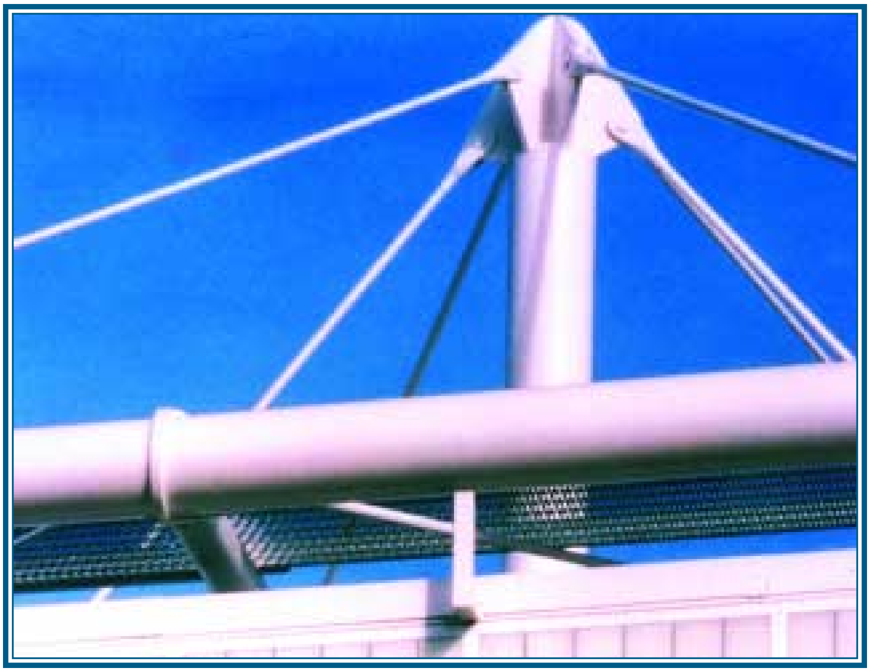
Schemes were developed around the theme of an internal courtyard space, but the severe need for parking and the decision not to build underground parking led to a more innovative proposal. The architect's solution was to place classrooms on the second floor, which was considerably larger than the first floor. The smaller first floor then left room below the overhang for parking. In the initial sketches, the second floor was clad with Kalwall, a translucent composite panel consisting of an aluminum grid between two layers of fiberglass-reinforced polymer, and the cantilevered second level was suspended on cables from three-story masts.

After extensive feasibility studies, it was determined that the 32' overhangs could indeed be hung from large masts. In the final design, the overhanging portions of the second floor and the entire roof are suspended from two rows of six 18"-diameter ASTM A500 Gr. B steel tube masts via tension rods and clevises in sizes varying with load. Hanger rods supporting the cantilevered portion of the second floor are attached to tendon points along the roof perimeter.

A crucial aspect of the design was the resolution of the forces in the sloping hangers. The roof structure acts as the compression chord of a truss, but unlike more conventional buildings where a roof diaphragm would provide horizontal rigidity, the Learning Center had a steel framework consisting of laterally unsupported elements floating above translucent panels.

Instead, the Kalwall roof is supported on hangers from the structural frame, which consists of tubes and wide flange shapes. The panels span 14' between continuous rows of headers that also support rain gutters. No supports penetrate the panels.

The project design is extraordinarily efficient. The use of steel in pure tension, rarely seen in build-



ings, allows full cross sections to be uniformly stressed, taking maximum advantage of the natural strength of the material. Members are smaller and the framework lighter than in conventional flexural/compression stress systems. More practically, the extensive use of architecturally exposed structural steel provided the desired high-tech appearance at no additional cost.

Another consideration was the building's location in a seismic region. Shear walls or braced frames were rejected since they would have constrained classroom flexibility. Instead, moment connections were utilized. However, the overhangs on the long sides of the building prevented the design of lateral force-resisting elements on the perimeter of the structure. This problem was solved by locating frames relatively close to the perimeter at the ends of the structure, providing additional strength needed to resist torsional effects during an earthquake.

A potential problem arose when no domestic supplier could be found to economically manufacture the relatively small number of high-strength fittings required for the project. Ultimately, two European manufacturers were found and McCalls Special Products of Sheffield, England (a division of AISC Associate Member British Steel) was chosen since their bid was slightly more economical and more compatible with the desired architectural aesthetic.

Project Team

Structural Engineer:
Drew A. Norman & Associates, Silver Lake, CA

Architect:
Stephen Woolley & Associates, Venice,CA

General Contractor:
Swinerton and Walberg Builder, San Francisco

Steel Fabricator:
Junior Steel Company, Industry, CA