THE INTEGRATED USE OF DAYLIGHTING APERTURES, LOW-EMISSIVITY GLAZINGS, AND CAREFULLY DESIGNED SHADING DEVICES PROVIDES THIS LIBRARY WITH ABUNDANT NATURAL LIGHT WHILE PROTECTING AGAINST DIRECT BEAM PENETRATION AND SOLAR HEAT GAIN INTO THE SPACES.

Multi-Agency Library Benefits from Daylighting Strategies

The Multi-Agency Library on the campus of the College of the Desert is a unique example of how public entities can work together to accomplish a common goal. The County of Riverside, the City of Palm Desert, and the College of the Desert collaborated on the design and contributed resources towards its construction. The 38,680-square-foot, single-story library is organized around a north/south vaulted circulation space that connects stack and reading areas, appropriately sized to serve the different populations. A multi-purpose hall used for community meetings and seminars is also housed in the front end of the building.

As lighting is the primary load in a library, the design team, working with several energy design professionals, aimed to use the considerable natural light available in the desert climate to reduce energy use. At the same time, it was critical to minimize the penetration of desert heat and direct beam light which would be detrimental to the function of the spaces. Carefully shaded vertical glazing in high clerestories over the vaulted areas, punched windows adjacent to offices, and roof monitors over the reading carrels were included in the design to ensure ample light and illumination without solar heat penetration. Window size was minimized in the stack areas due to concerns about fading.

To control and disperse the light entering the spaces, a variety of shading options were investigated and evolved into major design features for both the exterior and interiors of the building. Because of the range of apertures employed in the design, several shading devices—each appropriate to its orientation—were adopted.

- On the west side of the library, a 12-foot-deep colonnade spans the entire front side of the building, shading the windows that provide light into the ground floor offices and work areas.

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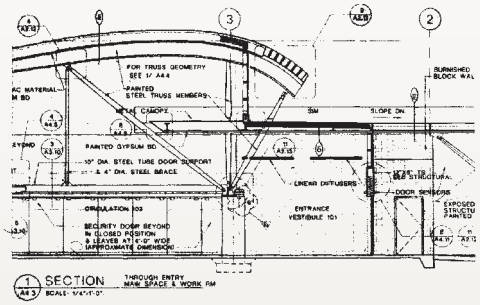

• On the south side of the building a nine-foot painted metal sunshade covers the concourse.

• An arched tube steel sun louver, constructed of metal fins and mounted to follow the curving roof, extends out over the west and east side clerestories.

• To shade the reading room from the morning sun through the high clerestory, three perforated metal sheet shading elements were placed horizontally below the east-facing sun louver.

• Overhangs spaced every three feet vertically from the bottom to the top of the aperture shade the glass in the south-facing vault clerestory.

• A vertical perforated metal sheet mounted directly in front of the glazing minimizes summer sun penetration through the north-facing glass in the vault clerestory.

• Steeply sloped roof monitors with vertical glazing reflect and bounce natural light down into the reading areas without allowing the entrance of disconcerting direct-beam light.

The impacts of six glazings, ranging from dual-pane clear to reflective high-performance tints, were evaluated by the energy consultants. Results obtained through computer simulation modeling showed that double-pane clear glazing units incorporating a visually imperceptible low-emissivity coating would allow maximum light transmission as well as the best color rendition, while providing the best resistance to heat gain.

The energy-efficient lighting system uses a combination of fluorescent T-8 lamps with electronic ballasts in the offices and reading/stack areas, and indirect metal halide fixtures in the high vaulted circulation areas. Continuous dimming controls modulate the fluorescent lights, as supplementary natural light is available, so that changes in illumination are imperceptible to those occupants focused on reading or work tasks. Automatic on/off photocell control is used for the indirect metal halide fixtures illuminating the vaulted areas as they are usually well-lit by light entering through the clerestories.

The mechanical system consists of a variable air volume system with an air-cooled rotary chiller and a natural gas boiler. An additional strategy used to reduce energy use in the building is the use of high-efficiency motors rather than standard-efficiency motors for all fan motors and pump motors.

THE ARCHITECT REMEMBERS THE PROCESS OF WORKING WITH ENERGY DESIGN PROFESSIONALS AS "TERRIFIC." WORKING ON AN INTEGRATED DESIGN TEAM WITH MANY HIGH QUALITY CONTRIBUTORS "GAVE EVERYTHING REAL REASON AND A REAL MEANING," SHE RECALLS.