Are you ready for the Getty?

Roof of L.A. museum is a work of art
Working steady for the Getty

Roofing systems a masterpiece; planning process a work of art

Are you ready for the Getty? That was the challenge presented to the design and installation teams that were selected to build the $1 billion Getty Center, which became the largest single-phase construction project in the history of Los Angeles.

Constructing the roofing systems presented planning challenges needing the true touch of an artiste. This colossal museum complex, which took five years to build, is now home to priceless artworks, ancient artifacts and rare research papers that must stay dry at all costs—and these overhead protection surfaces are required to maintain a picture-perfect appearance for years to come.

The materials selected for the roofing systems were specifically chosen to blend with the construction details of the world-class facility. The project, located in the hills overlooking Los Angeles, is an extraordinary effort that is destined to be a lasting landmark and architectural masterpiece.

In this setting, the elements of architectural sophistication and watertight protection from the elements are united to create the look of a seamless design scheme.

The 110-acre site provides sweeping views of the Los Angeles basin, the mountains, the ocean and the surrounding 600 acres, all preserved in their natural state.

The complex features a new J. Paul Getty Museum, dramatic gardens and distinctive buildings that house the Getty Research Institute for the History of Art and the Humanities, the Getty Conservation Institute, the Getty Education Institute for the Arts, the Getty Information Institute and the Getty Grant Program.

With about 240 subcontractors taking part, numerous people were enlisted for this endeavor of almost unbelievable
scope. Keeping the participating parties organized was critical for maintaining the pace of construction, which involved moving a million-and-a-half cubic yards of soil and pouring more than 260,000 cubic yards of concrete.

"It was pretty complicated to manage a project like that," recalls Jim Crawford, the roofing specifier, who is an associate partner with architect Richard Meier and Partners of New York and Los Angeles. Crawford also set up in L.A. a new Meier office which at the height of construction employed some 90 people.

"Everything on the job was custom," Crawford notes. A scale model of the complex was so intricate that it took three trucks to haul it to a Paramount Studios sound stage, which was just about the only site suitable in size for setting it up for photography.

"There were two overriding concerns" revolving around the roof design. No. 1, it couldn't leak: "The value of the contents was much more than a typical commercial office building," Crawford reports. And No. 2: "Because it's a museum project you want the system to last as long as possible."

While proper product performance was necessary when contemplating materials selection, teamwork and technical expertise were other major considerations when suppliers were chosen.

"On a job of this size, even with the best of materials, you are going to run into situations where you need responsive technical support," Crawford points out. The vendors were expected to pitch in with additional knowledge at any given moment. "We had the manufacturers' reps out here regularly."

The scope of organization involved executives, professionals and craftspeople at all levels. "These guys were on the job from start to finish," Crawford says. "Whenever we had questions we got close attention. This job had a lot of oversight and a lot of scrutiny."

Because of all the construction phases and the sheer magnitude of the work to be done, "It was really like working on 10 jobs at the same time," according to Crawford, who observes that close supervision was an ongoing aspect of keeping things moving along. "The owner had his own consultant watching our consultant."

Roofing Forensics of Yorba Linda was consulted in regard to much of the field work involved in preparing a most spectacular and complicated roofing system encompassing some 1 million square feet of coverage. The company's Mark Vanderslice was especially valuable, and the expertise provided "was worth its weight in gold," Crawford reports. "They also helped us select the various products we used."

American Hydrotech Inc., Chicago, supplied much of the materials, such as the monolithic 6125 membrane (see Figure 2). It was applied with assistance from Keel Corp. of Huntington Beach, Eberhard Roofing of Van Nuys and the D.V. Troyer Co. from Artesia, CA. Dinwiddie Construction of L.A. was the general contractor.

Creating partnerships

Meetings, meetings and more meetings occurred before the actual work commenced. "An early partnering effort integrated with all the firms involved with our portion of the work was key," explains David F. Spalding, American Hydrotech's president. "Several critical tie-in details had to be developed, and this emphasized the importance of getting involved in the job early." He adds that "our philosophy is to form a working partnership with every member of the building team when needed—to ensure a total solutions approach on each project."

Watertight integrity was the main mission, but chief architect Meier had developed a master plan
that provides a balance between the natural and the manmade, and the ambiance and detailing suggests Los Angeles at its most Mediterranean.

From the Museum's terraces and walkways, visitors are enjoying breathtaking, unexpected views of the nearby Santa Monica Mountains and snow-capped San Gabriel Mountains, the downtown skyline, city neighborhoods, the Palos Verdes peninsula, and Santa Catalina Island, plus sunsets over the Pacific Ocean.

Inspired by this interplay, Meier sought to design the new complex "so that it highlights both nature and culture," he says.

When approached from the south, the modernist complex appears almost to grow from the hillside. The spine of the hill runs north to south, roughly parallel to the San Diego freeway. At the top of the hill, where the main buildings are located, two ridges branch out, forming a Y. Working with this natural topography, Meier's plan suggests a connection between the organization of the Getty Center and the layout of the city's grid.

The angle at which the ridges intersect—22.5 degrees—is the same as the angle in the freeway below as it bends away from the Los Angeles street grid to cut through the historic Sepulveda Pass.

Two three-car, computer-operated trams ferry visitors from a street-level parking facility to the hilltop site. The campus, clad largely in cleft-cut, Italian travertine, is organized around a central arrival plaza. Galleries, offices and the Auditorium lead out to courtyards and terraces; all offices receive natural light. Because the Getty's neighbors requested that the complex be no more than two stories above grade, all of the buildings extend underground and are linked with subterranean corridors that facilitate the moving of artwork and other materials.

"These buildings have a lot of their surfaces under dirt," Crawford points out. "Because it's got a lot of area below grade, the most challenging feature was that we had to do so much waterproofing. We had almost every roofing problem and waterproofing problem imaginable," he recalls.

This is where the Hydrotech line of materials came in handy. "It had a lot of properties that were attractive to use," says Crawford. "That material also allowed us to use it for walls."

The materials had to provide a base for assorted plantings and other functional aspects of the complex. "We have roofing underneath landscaped areas (see Figure 1) and we have roofing underneath sidewalks," Crawford says, adding that even the arrival spot for the visitor's tram is located atop a roof.

"We do a lot of the high-profile jobs in America," says Spalding, and the Getty project used Protected Membrane Roof design techniques suitable to those found on the Rock and Roll Hall of Fame and Museum in Cleveland.

"Obviously the scope of the Getty work was extremely complex," says Spalding. "With the myriad of different deck levels—it was all very complex. The material
was very well-suited because it's very forgiving.”

Crawford adds that each stage of the metal deck/concrete topping installation had to demonstrate its ability to perform under real-life conditions. “You have to test it,” he declares. “You learn a lot during the testing process.”

Water flowed freely during these portions of the project. “They had fire hoses out here and they’d put a couple inches of water on the roof,” Crawford recalls. “We did a flood test on every horizontal surface.”

Washed river rock and pavers were frequently called upon for assorted surface coverings. “In some areas we actually used stones on pedestals,” Crawford says. “These devices (from Hydrotech) allow you to make adjustments in angle and elevation.”

Skylights were all set on one-foot curbs, and window surfaces include systems to control light volume. “Every hour they adjust a little bit—essentially they’re tracking with the sun.”

A computerized system operates adjustable louvers regulated by sensors timed to the sun’s movement. “This will approximate as much as we can the conditions in which artists painted,” notes museum director John Walsh. “Daylight brings out subtleties of color and texture that artists could see in their studios. Electric light is no substitute.”

The Golden State’s mostly mild weather aided in Crawford’s roofing and wall specifications. “We were able to take advantage of the fact that it doesn’t snow here in the detailing of the building. If this had been a climate where it snows there would have been a freeze-thaw cycle,” he explains.

The use of stone—1.2 million square feet of it—is perhaps one of the most remarked-upon elements of the new complex. As Meier explains: “This beige-colored, cleft-cut, textured, fossilized travertine catches the bright Southern California daylight, reflecting sharply during morning hours and emitting a honeyed warmth in the afternoon.”

The 16,000 tons of travertine used in the project were quarried in Bagno di Tivoli, Italy, 15 miles east of Rome. Split along its natural grain, detailed impressions of leaves, feathers, fish and shells can be seen in the Getty Center’s travertine; one particularly unusual piece holds the fossilized remains of a deer antler.

Meier and his staff worked for a year with the Bagno di Tivoli quarries to invent a “guillotine” process that would result in a rough, textured finish. “About a dozen of these stones,” Meier reports, “are incorporated into the regular grid for a change of scale and color—to break things up—and mark a key point.”

Travertine panels cover not only the retaining walls and the bases of all buildings, but also serve as paving stones for the arrival plaza and Museum courtyard.

In addition to the unique rough-cut splitting of the stone, Meier designed a special mortar-free mounting technique, called the “open-joint stone system,” used on the Center’s facade. Each block is fitted with stainless steel wall anchors that hook the stone into place. A special backing
wall protects buildings from rain, which runs through the open joints between each stone. This protects the surface of the travertine from streaking and wear. The separations also prevent the blocks from touching in case of an earthquake. To slow deterioration and color change, each block has been treated with a silicate-based water repellent, and paving stones have also been treated with an anti-resistant coating to help cleaning and reduce soiling.

Sever: types of sealants from Dow Corning were used for the Getty Center’s curtain walls and waterproofing. The 15,000 gallons of silicone sealants marked the largest individual application for this type of project, according to Dow Corning’s Bob Krench. “The Getty Center is a dream project for any construction materials supplier,” Krench comments.

“Because of the large volume of sealant used and the critical nature of the sealants’ performance, the situation demanded a high level of quality control,” according to John Gustafson, vice president of Curtain Wall Design and Consulting Inc. CDC wrote the specifications for all the metal and stone exterior panels, windows, curtain walls, skylights and canopies.

L.A.’s Harmon Contract WSA was the building enclosure contractor. “The expectation for quality was very high, and we needed systems that would not only keep out air and water and accommodate seismic movement, but also answer aesthetic and quality requirements,” says Brad Krumera, senior project manager. Some 20,000 pages of shop drawings were required.

The Getty’s hilltop location had been undeveloped, so the first three years of work involved infrastructure needs such as utilities, roads and a parking garage. The actual main building construction began in 1992 and continued for five years.

An earthquake in 1994 resulted in an engineering seismic upgrade of the steel-framed buildings, and interior walls were also strengthened with structural steel to be sure that priceless paintings don’t fall to the floor during subsequent tremors.

**Open spaces**
The Getty Center provides 945,000 square feet of space excluding entrance and parking facilities: 505,000 square feet for program areas, and 440,000 square feet for food service, storage, maintenance, mechanical equipment and service areas.

The campus covers 24 acres of the 110-acre site; the rest is landscaped or left in its natural state. Within the campus, the buildings occupy just under five acres, with the remainder consisting of gardens and terraces. An adjoining 600 acres owned by the Getty Trust preserves the natural quality of the area.

The Getty Center encompasses six low-lying buildings clustered along the hilltop’s two ridges in a plan that responds to the natural contours of the site.

The Museum and other buildings have exterior surfaces of metal panels, molded to fit their more fluid, sculptural forms.

The design naturally invites visitors to wander indoors and out, exploring galleries and gardens alike. The plan encourages visitors to come and go as they please, making their own routes, and pausing in the courtyard to listen to a fountain or have a cup of coffee.

Inspired by the garden traditions of California and the ancient Mediterranean, the landscaping aims contribute to the Center’s striking mix of ancient and modern artistry. Visitors to the Getty Center are surrounded by recurring colors, textures and scents.

Robert Irwin’s 134,000-square-foot Central Garden was commissioned by the Getty Trust as a work of art.

The garden offers visitors constantly changing experiences, conditioned by the weather, the hour of day, the time of year, and the use of seasonal plants.

While Irwin’s plan for the garden sprang from the powerful, controlled geometry of the architecture and from the site itself, he conceived the garden as a "conditional" work of art: In contrast to the more static nature of the buildings, the Central Garden is always in flux.
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Roofing & Waterproofing Forensics is proud to have been a part of the roofing and waterproofing systems design for The Getty Museum project from 1989 through 1997. We also provided related inspection services observing the installation of most of the vertical and horizontal waterproofing systems.

We sincerely hope that you will take the opportunity to view the museum for yourself. We believe you will appreciate the masterpieces of artwork as well as beauty of the buildings and grounds that make up the museum. The Getty Museum was designed to be appreciated for many generations.

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