

For the Six Million

Moshe Safdie's redesign of Jerusalem's Yad Vashem memorial campus presents the Holocaust narrative in a much more personal light.

By Barbara Horwitz Bennett, Contributing Editor -- *Building Design & Construction*, 4/1/2005 12:00:00 AM

As Israel's second most popular tourist site, after the Western Wall, the Yad Vashem Holocaust museum takes its visitors on an intense, emotional journey of one of the twentieth century's most dreadful events.

Situated on a small mountain in western Jerusalem, Yad Vashem attracts more than two million patrons per year. This includes every Israeli high school student and soldier, who are required by state law to visit the site.

It was with a view to this next generation that the organization decided it was time to rebuild the original exhibit hall and add new facilities.

"We needed to rearrange ourselves for a world without [Holocaust] survivors, to build a connection to a younger generation who will no longer be able to meet fact to face with survivors," says Avner Shalev, Yad Vashem chairman and chief curator.

The new Holocaust History Museum, which was dedicated March 15 at a ceremony attended by dignitaries from 40 countries, presents a much more intimate and personal expression of the Holocaust experience, featuring hundreds of artifacts and 100 video screens displaying documentaries and survivor testimonies.

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Woven throughout the museum's narrative are the individual stories of 90 victims told through their personal effects, such as a broken toy, drawings, an article of clothing, or letters.

Casting the design

Led by Moshe Safdie Architects, the design team was originally given the directive of designing the new space so as not to disrupt the surrounding landscape, nor to compete with the prominence of the site's main focus, the Hall of Remembrance, as expressed in the term Yad Vashem (meaning "a memorial or monument and a name") taken from Isaiah 56:5: "And to them will I give in my house and within my walls a memorial and a name ... that shall not be cut off."

Safdie's solution was to design the historic museum as a concrete prism penetrating 200 meters straight through the mountain, with each end cantilevering dramatically into open air. "The rupture in the continuity of the mountain represents the rupture [which took place] in the European Jewish world," says Shalev.

Visitors traverse the dark underground while experiencing one of the darkest chapters in human history.

"The triangle gets narrower as it moves through the mountain and the floor descends at 5%," according to Safdie. "But then it opens up again and the floor ascends at 5% as the visitors go from the darkness of the earth to light, to hope."

Visitors enter the prism via a floating pedestrian bridge that is meant to serve as a transition from daily life to the Holocaust experience. The newly designed entrance pavilion is sloped upwards at 4% to slow one's walking pace upon entry into the museum complex.

Inside the new exhibit hall, which spans more than 96,000 square meters—three times that of the old facility—visitors are first introduced to the cultural and social life of the pre-war European Jewish communities. The exhibit space then zigzags back and forth through exhibits that relate various elements of the Holocaust story, but always returning visitors to the main concrete spine, where diagonal breaks in the floor represent

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milestones in history.

Safdie's rationale: "We didn't want to give people the opportunity to walk right through, so instead the channels cut in and out."

Both the main museum spine and the side exhibit rooms utilize skylights to supplement artificial lighting. "Even through the dark experience of the Holocaust, one is still connected to the exterior as natural light escorts you," says Irit Kohavi, principal architect and director of Safdie's Jerusalem office. Adds Shalev, "We didn't want the space to be dark and gloomy. The content is heavy enough."

The skylights in the side exhibit are fitted with aluminum shading panels, which can be adjusted based on the time of year and the amount of natural light the curator desires for that specific exhibit. As for the skylights in the main spine, low-e 40% fritted glass was specified for shading.

Just below the skylights, side fire sprinklers were intentionally tucked away out of sight—it was felt that the sprinklers would be seen as reminiscent of the gas chambers, according to Kohavi. For similar reasons, the M/E/P systems are hidden inside a two-and-a-half-meter floor plenum.

Toward the end of the exhibit is the newly designed Hall of Names, where a suspended cone overhead depicts photographs and images taken from three million testimonial pages stored there and recorded by relatives and friends of those who perished in the Holocaust. Directly below, the cone is mirrored by a reciprocal core excavated into the natural sloped bedrock leading down to a lit reflecting pool of still water, in commemoration of those who were lost without any evidence, says Kohavi.

Just before the exit, where the prism's concrete walls "flare out like two wings" (according to Kohavi), is a new room containing a computerized archive of victims' names, which visitors are free to search.

Complex geometry

The unique nature of the exposed architectural concrete prism greatly complicated the task of constructing the new museum. In fact, several contractors went so far as to submit 25-square-meter concrete construction mock-ups, only to pull out of the competition. Ultimately, two local contractors, Minrav and Cemental, teamed up on the job.

One of the first issues to be dealt with, even before the contractor came on board, was deciding whether to excavate the ridge where the new structure would be built in stages or all at once, according to Lewis Brown, of Tafnit Wind, who served as the project's construction manager.

Everyone agreed that it would have been cheaper to partially clear the site in stages. But the Building Team was concerned that this approach would pose additional difficulties for the contractor. As a result, the museum

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agreed to pay the premium for excavating the whole site at once. "Ultimately, it paid off in the long run," says Brown.

Instead of Jerusalem stone, which is required for all buildings in the city, the project received special permission from the city to use concrete. This would be done utilizing 10×2½-meter concrete forms. However, in order to pour and set such a large number of forms, a significant amount of steel scaffolding had to be custom designed.

Brown explains how it was done:

"Every two-and-a-half meters, scaffolding triangles, each one different in size, had to be precisely located," he says. "The steel mold also had to be flexible enough to get the right form."

"Once the mold was set up, a negative form was slid in between the scaffolding, the concrete was poured, and the mold was tied with a bond."

"After removing the mold, the scaffold was used to support the walls, since post-tensioning was done at the end." Brown says the set-up for each pour took two days, with three pours taking place each day.

Grade-one architectural exposed concrete was used for the envelope walls in the side exhibit gallery. For the structural envelope, Safdie wanted to use the natural bedrock, but that proved impossible. Instead, 3½×8-meter exposed concrete precast panels became the second-best choice.

Ultimately, 250 tons of steel were used to build the scaffolding, says Brown. Including the steel needed for temporary bridges for vehicles and pedestrians, the price tag for the steel came to well over a half million dollars.

Pouring and setting the concrete took a year, as work had to occasionally be stopped to accommodate VIP visitors and museum operations, according to Israel Chaskelevitch, of Chaskelevitch Engineering, based in Zichron Yaakov.

Moreover, because the concrete would not be waterproofed or thermally protected, the contractor had to work to achieve neat joints between each casting with close to uniform colors. Assisting in this task was the structural engineer, who performed detailed, computerized studies of the stresses that would be placed on the concrete walls.

Structural engineer Moti Cohen, of S. Ben Abraham Engineers, Tel Aviv, recalls the moment when support was pulled away from the concrete wings at the end of the prism (which are suspended 20 meters over the mountain ridge): "The structure lifted up a couple of centimeters when it was pre-stressed, and we all breathed a sigh of relief when it stood by itself."

With the new museum scheduled to open to the public on March 27, it remains to be seen how visitors will judge Yad Vashem's success in portraying in a new way the experience of the Holocaust nightmare.

Construction Costs



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Construction Costs

Museum complex	\$35,000,000
Museum exhibits	10,000,000
Entrance pavilion complex, parking and landscaping	18,000,000
Soft costs (planning, project management, VAT, etc.)	31,000,000
Total	\$94,000,000

Humanizing a historical event

For members of the Yad Vashem Building Team, the project was a highly charged emotional endeavor, due to the sensitive nature of what the **museum** commemorates.

"Both of my parents are Holocaust survivors, so this project was like closing the circle and connecting back to my childhood," says Irit Kohavi, project architect and director of Moshe Safdie Architects' Jerusalem office. "I saw it as my personal debt and mission to my parents and the families of my parents who disappeared in the Holocaust."

Team members said they were motivated to work even harder to meet the owner's objectives. According to Israel Chaskelevitch, managing director of Chaskelevitch Engineering, the team went out of its way to delay certain jobs, such as floor and exhibition wall casting, to afford Yad Vashem management as much flexibility as possible in making decisions about final exhibit design.

"I believe everyone on the project gave that extra inch just because it was Yad Vashem," states Lewis Brown, construction manager with Tafnit Wind.

Project Summary

Yad Vashem **Museum**

Jerusalem, Israel

Building Team

Client: Yad Vashem Holocaust Martyrs' and Heroes' Remembrance Authority

Architect: Moshe Safdie and Associates

Mechanical engineer: B. Schor Consulting Engineers

Electrical engineer: Etkin-Blum Electrical Engineers

Structural engineer: S. Ben Abraham Engineers



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SUBMIT

Construction manager: Tafnit Wind Ltd.

General contractor: Minrav Group

Acoustics: M.G. Acoustical Consultants

Landscape architect: Shlomo Aronson Architects

Exhibit designer: Dorit Harel Designers

Other additions to the site

In addition to the brand new historical museum, the redesign of Jerusalem's Yad Vashem campus by Moshe Safdie Architects, at a price tag of \$56 million, includes a new entrance pavilion, a visitors' center, a Holocaust art complex, and a temporary exhibitions gallery. A new synagogue, to be completed this summer, will feature a pre-war ark (where Torah scrolls are kept) imported from Romania.

Built from trademark Jerusalem stone, the entrance pavilion also utilizes beige granite imported from India. The granite was left over from the new Ben Gurion airside terminal, also designed by Safdie's firm (see *BD&C*, March 2005, p. 28).

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