

Ready for Takeoff

Israel's new international gateway brings striking architecture and new amenities to travelers to and from the Holy Land.

By Barbara Horwitz-Bennett, Contributing Editor -- *Building Design & Construction*, 3/1/2005 12:00:00 AM

Late last year, as an El Al airliner taxied out from Ben Gurion Airport Terminal 3 en route to New York, Hamid Kia could not help but see the event—the first such departure from Tel Aviv's new \$1 billion terminal in Tel Aviv—as symbolic of a remarkable personal journey.

"It's been a great ride," said Kia, of Skidmore, Owings & Merrill's New York office. He made Israel his home while serving as lead architect for three of the nine years it took an international team to replace the original terminal built by the British in 1937.

Engineer Ashok Raiji, head of the M/E/P team from Arup's New York shop, reinforces Kia's thought. "This was one of the most difficult, interesting, and challenging projects I've ever done."

For Ben Gurion Terminal 3, the largest construction project every undertaken in the history of the state, the Israel Airport Authority (IAA) opted to spread out the risk by bringing in four separate international building teams: one each for the landside facility, the airside terminal, the parking garage and roadways, and the energy plant.

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"The IAA clearly reached out to the international airport design community," says Marilyn Taylor, AIA, of SOM's New York office.

With so many design and construction professionals involved, both overseas and locally, close coordination and collaboration were essential. "We worked very hard to arrive at one architectural language," says Anat Stav, chief assistant to the IAA project director. "We also provided a very detailed program definition and were very involved in the process."

SOM was appointed the lead A/E design firm with the goal of "assuring that a complex that was being designed by eight architects and an array of engineers looked as though it was designed by one firm," says Kia. SOM's team furnished a set of design guidelines that maintain consistency of all materials to be used on the buildings, including glass, metal panels, Jerusalem stone, and concrete.

During the project's design phase (1995–1997), the IAA conducted intense, week-long meetings in Israel with the senior designers. Once the engineers came on board, the meetings alternated each month between Tel Aviv and New York. As a result of this dialogue, says Kia, the team was prepared to be more responsive to the client's needs and manage the schedule more effectively.

A distinctly Israeli setting

These discussions were also crucial to the process of educating the American designers as to how to reflect Israel's culture in its built environment.

One such case relates to the peculiarly unique sense of the "travel experience" in the Holy Land. "In the U.S., air travel is a very mechanical process," says Kia. "Not many people are greeted upon arrival, and there are not many well-wishers when one departs." In contrast, in the Middle East and perhaps especially in Israel, departure or arrival of a loved one is a very emotional experience attended to by large groups of family and friends.

"We all talk about airports as gateways," says SOM's Taylor. "Ben Gurion is the ultimate gateway reflecting the extraordinary emotion that goes with arriving in or leaving this country."

Thus, a hallmark of Ben Gurion Terminal 3 is its spaces devoted to such public gatherings: a greeters hall for arrivals, a well-wishers hall for departures, and the connector corridor bridging the landside and the airside terminals. In each of these spaces, SOM chose warm materials and designed grand expanses of space to accommodate what can amount to huge groups of people.

"When arriving in the greeters hall, passengers cannot help but feel as though they are standing on a stage," says Kia. "The counter-levered balconies on either side, the central water fountain, and the monumental columns all contribute to this sense of importance as one exits customs and arrives in the hall." Adds Arup's Raiji, "The ceremonial procession is an event."

The sense of drama continues into the long, ceremonious connector corridor, designed by Moshe Safdie and Associates, Somerville, Mass. The original plan for the connector called for separate levels for departing and

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arriving passengers. Safdie's people were able to convince the IAA to put arriving and departing passengers into one common volume where they could see each other through a glass partition as they traversed the shared space.

The new design accentuates the drama of the journey by affording both groups of passengers a visual connection to the outdoors as they descend on ramps at opposite ends of the connector. The SOM/Safdie team worked closely with the traffic engineers to split the parking garage, opening up space for a Seven Species garden to be planted outside the full-size windows running along the landside building. (The "seven species" refers to the rich produce of the land of Israel described by Moses in Deuteronomy 8:7–9). The connection to the landscape continues through the connector, where travelers are offered a spectacular view of the Judean mountains.

In similar fashion, the architects were able to keep the new commuter train serving the airport below grade so as to avoid interrupting the connection to the land, according to Taylor. The train has become a significant boon to travelers, for the first time linking the airport with Tel Aviv, Haifa, and a number of other cities.

The exciting movement continues into the piazza, where departing passengers can see the arriving passengers on the upper-level transportation bridges, which hang from the roof by rods.

From a structural standpoint, the architects chose to expose the structure, prefabricating the architectural white concrete columns and beams on-site and running them along the connector and into the rotunda.

After an extensive search for just the right mix of concrete for the beams, an Israeli supplier was chosen to provide the high-grade architectural concrete, a mix of 70% grey and 30% white cement, says Mishael Talmor, of Minrav Engineering. Ashdod, Israel, the local contractor on the airside terminal.



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of Minrav Engineering, Herzlia, Israel, the local contractor on the airside terminal.

Richard Hough, a principal with Arup Structures, Sydney, Australia, who served as a structural consultant during the early phases of the design, praises the team for executing the job so nicely: "It is a fine piece of architecture using exposed concrete structure as a significant part of its expression, capitalizing on Moshe Safdie's skill and experience in that medium and the Israeli precast concrete industry's considerable capabilities."

Another unique aspect of the design was the architects' concept of integrating the building systems with the architecture by housing the ME/P systems right inside the structural columns and beams. "We designed the beams as a double column in the form of the letter H," says Irit Kohavi, Safdie's principal in Jerusalem, who led the airside team. "Between the two pieces there is a space of 30 meters by 80 meters where we located all the systems, one column for electrical wiring, one for plumbing and HVAC ducts, and one for communications cables."

Most of the building materials were chosen locally, but a few special systems came from abroad. Twenty-five thousand square meters of acoustical ceiling was imported from Canada, aluminum cladding for the façade was brought in from Turkey, and 24,000 square meters of granite was cut in Italy and finished in India.

But what gives the airport a local feel is the Jerusalem stone that was used for the main finish of the vertical surfaces. "Ben Gurion does not have the 'coldness' that is generally felt at many other airports around the world," says Kia. "The simplicity of the planning diagram, along with the choice of materials, has created spaces that are warm in nature and help ease the tension and anxiety that is generally associated with travel."

A time to relax

When the departing passengers complete their stroll through the connector, they arrive at the rotunda, where an attractive waterfall and 35,000 sqm of duty-free shops await them. "The water calms the atmosphere and creates a relaxing environment, which is totally the opposite of what usually happens in airports," says Kohavi.

"The fountain is very impressive and a big surprise for the passengers," says Minrav Engineering's Talmor, who calls the rotunda-as-urban-plaza an unusual design element.

To preserve the uniqueness of this space, Safdie's team convinced the IAA to provide strict guidelines to the concessionaires to prevent the piazza from turning into a visual hodgepodge.

"We designed all of the shop facades and created a three-meter-deep zone where the flooring and ceiling of the rotunda continues into the stores," says Kohavi. "This way, the concessions are harmonious with the building as we dictated the boundary, envelope signage, and materials." In addition, the same finish that was used on the walls was also used on the store signs.

The central rotunda's beauty gently hides the complexity of the structure itself. "For this very heavy, unique, three-dimensional steel structure, we needed a special system and the equipment to put it in place," says Talmor.



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Safdie designed the roof of the rotunda as an inverted dome, an asymmetric dish floating above the piazza that lets sunlight in and filters the daylight with a special white fabric ceiling.

The rotunda was also built with an aluminum panel on the outside and a special ceiling, impenetrable to water on the inside, which added to the construction challenge.

Although the project was announced in 1994 by the late Prime Minister Yitzak Rabin, it was confounded by numerous delays. "We had to deal with many political, economic, and internal obstacles, such as getting permits and dealing with closures to foreign workers," says the IAA's Stav.

Construction on the airside terminal screeched to a halt in 2000 when the lead contractor, a Turk, was seized by the Turkish government. The job was abandoned for eight months while the IAA reviewed bids from the three other contractors already on site, ultimately choosing Minrav, the contractor for the parking garage and roadways, to oversee the airside terminal.

Minrav took over in 2001, after part of the skeleton of the airside terminal had already been constructed. "We had to create a large technical team to revise 1,600 plans," says Talmor. "We had a lot of questions, and it was a long, tedious process to get all the answers."

The landside terminal posed its own share of problems for contractor Avi Arenson, of Caesarea. "The architects had a lot of imagination and we had to try to build what was in their minds," says project manager Moshe Avital.

For example, a long limestone wall at the back of the ticketing counter on the second level was designed by SOM to extend all the way down to the arrival hall on the level below. The wall was partially linear and partially round, making construction difficult.

Avital also found the decision to use U.S. National Fire Protection Association codes somewhat hard to live with. "I could not understand why they wanted to go with American codes," he says. "We are living in Israel and have Israeli codes."

According to SOM's Taylor, the IAA had expressed clear interest in designing to international standards, but at the same time, it was clear that the local Israeli consultants had to be able to build what the architects were putting on paper.

"We were very keen to develop these local relationships because no matter how beautiful the design was, it didn't matter if we couldn't get it built," says Taylor.

Under these circumstances, conflict was inevitable. One place where it cropped up was in the restriction against using Israeli metal doors, which offered up to two hours of fireproofing, whereas the NFPA code requires only one-hour-rated doors. Nevertheless, 1,200 metal doors were shipped in from the U.S., "and all the logistical problems that went with it," according to Avital.

When changes were made and additional parts had to be ordered, a decision had to be made whether to wait three or four months for the parts to arrive by ship, or to absorb the expense of shipping by air.



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Numerous changes to the design of the communications system and the baggage handling area also complicated matters. "We constantly had to stop, wait for new orders, then start again," says Talmor. "This required a lot of coordination with other contractors. It took a long time, a lot of manpower, and a lot of effort."

Even though Terminal 3 kept hundreds of building and design professionals scrambling for years, the consensus seems to be that it was worth the effort. "Ben Gurion is truly a state-of-the-art aviation facility on a functional, emotional, and spiritual level," says Kia. "It is one of the most spectacular buildings I have ever worked on."

Building Teams

Ben Gurion Terminal 3 Tel Aviv, Israel

Landside Terminal: U.S.-based consultants

Lead A/E design firm: SOM

Structural engineer: Arup

Mechanical engineer, vertical transportation: Arup

Electrical engineer, plumbing/fire protection: Earth Tech

Lighting: Arup Lighting

Fire and life safety: Arup Fire

Acoustics: Arup Acoustics

Communications and IT: Arup Communications

Landside Terminal: Israel-based consultants

Architect: Rom and Ada Karmi

Structural engineer: J. Kahan and Partners Consulting Engineers

Mechanical engineer: B. Schor and Company Consulting Engineers

Electrical engineer: Yanai

Plumbing/Fire Protection: Amnon Yosha Consulting Engineers

Communications/IT: Nogay

Vertical Transportation: S. Lustig Consulting Engineers

Airside Terminal: U.S.-based consultants

Architect: Moshe Safdie Architects/TRA-MSA

Engineering: Black & Veatch

Lighting: Horton Lees

Aviation: Arai Jackson

Airside Terminal: Israeli-based consultants

Architect: Moshe Safdie Architects

Structural engineer: Muller-Yaron-Maller Group

Plumbing/fire protection: Abraham Schwartz Engineering

Mechanical engineer: Danny Hahn Consulting Engineers

Electrical engineer: D. Bar-Akiva Consulting Engineers

Communications/IT: Y. Leshem Shachak

Vertical transportation: S. Lustig Consulting Engineers

Safety engineer: Eidan Safety Engineering

Landscape design: Shlomo Aronson Architects

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