Studio Fuksas drapes glass and steel as if it were fabric over its **MILAN TRADE FAIR**, a convention center for trade and fashion

By Paul Bennett

The entire peninsula of Italy is about the size of Arizona. Rome, its largest city, has fewer than three million people, and Milan about half that. More important, Italians are accustomed to small things: narrow streets, Fiat 500s, and demitasses of espresso. But something happened on the plateau between Milan and Turin this past year, and for several months Italy contained the largest construction site in the world.

The result was the Fiera di Milano, or the Milan Trade Fair, a mile-long exhibition fairground designed by Roman architect Massimiliano Fuksas. The Fiera covers 2.1 million square feet, provides 20,000 parking spaces and two-dozen restaurants, and by almost every measure stakes a legitimate claim to being called a megastructure.

"The new Fiera is not a building," says Fuksas. "It's too big. Some 50,000 people could live inside of it." Fuksas considers it "a city in itself." But it's not a city. The Fiera is a convention center, and so from the start Fuksas grappled with the critical challenge that confronts all overly large buildings of this sort: legibility. How does one design a place like this so that we don't find ourselves spinning around in mind-numbing circles, consumed, in a way, by the ongoing bigness of the place?

Fuksas dealt with this, first, by creating a strong central image for the building that continually draws the viewer's attention inward: a glass canopy that bisects the complex and loosely binds together its disparate elements. A waving, undulating gesture, this canopy—nicknamed *vela*, which is Italian for sail, by the workers—is composed of a steel-mesh armature divided into rhomboid and triangular nodes holding triangular glass panes. In addition to slender steel pillars, the roof is supported by vortexlike parabolas of glass and steel that give the impression that the canopy floats, only touching the earth here and there.

Like any glass house, the canopy reflects and refracts a tremendous amount of light and therefore creates a luminous glow that is visible everywhere, even in the darkest innards of the pavilion buildings. One always has a sense of where the center of the site is. An elevated, blue-tinted walkway that runs under the full length of the canopy feels ethereal, even cosmic, flooded in intense light and surrounded by waving glass.

Placed along this linear Main Street of glass and light are the buildings that actually house the complex's many activities. In order to make the entire ensemble seem coherent, Fuksas created a rigid architectural typology to demarcate each building's function. There are four types. The eight exhibition halls, where the bulk of the trade-show booths will be set up, are highly functional—one might call them industrial—warehouses. Large (530 by 730 feet) rectangular boxes with huge nozzlelike protrusions in their roofs, sheathed in polished steel, have orange facades facing the canopy: a burst of color in this otherwise airy space that makes them immediately recognizable. In the middle of the site, marked by a huge glass-and-steel cone, rests the "service center," which contains a main

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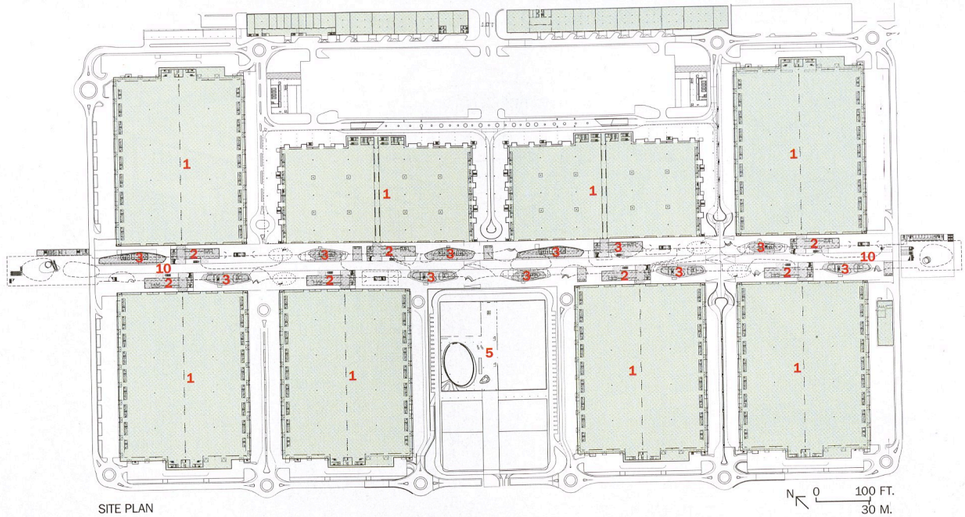
Project: *Milan Trade Fair, Italy*
Architect: *Studio Fuksas—Massimiliano Fuksas, principal; Doriana O. Mandrelli, art director; Giorgio Martocchia, Angelo Agostini, Ralf Bock, Giuseppe Blengini, project architects*
General contractors: *Astaldi; Vianini; Pizzarotti*
Structural engineer: *Schlaich Bergermann und Partner*

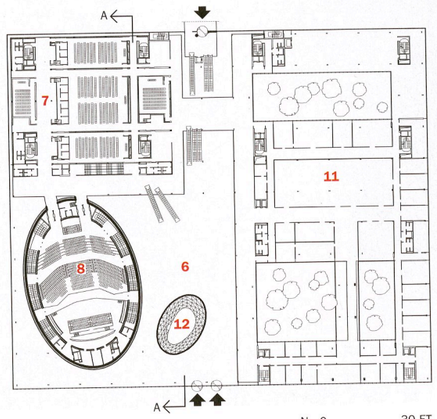
The noncurved region of the *vela* (Italian for sail) roof is an even, quadrangular grid arranged diagonally. In the transition to the curved regions, the warp of the quadrangular mesh exceeds the limit set for plane glass, hence its subdivision into triangular mesh.

PHOTOGRAPHY: © GIUSEPPE BLENGINI/STUDIO FUKSAS

The center of the site is traversed by a nearly mile-long elevated walkway (left and above), covered by the canopy, which moves in and out of the trade fair's buildings, but never touches them. As a rule, tree columns, with six branches each, support the *vela* roof at regular intervals. The two inner branches serve as drainage. Occasionally, the glass-and-aluminum-clad canopy touches the ground in full- or half-volcanoes (section, opposite). In some cases, the canopy rests on the buildings underneath. The *logo* roof (top) marks the entrance to the trade fair.

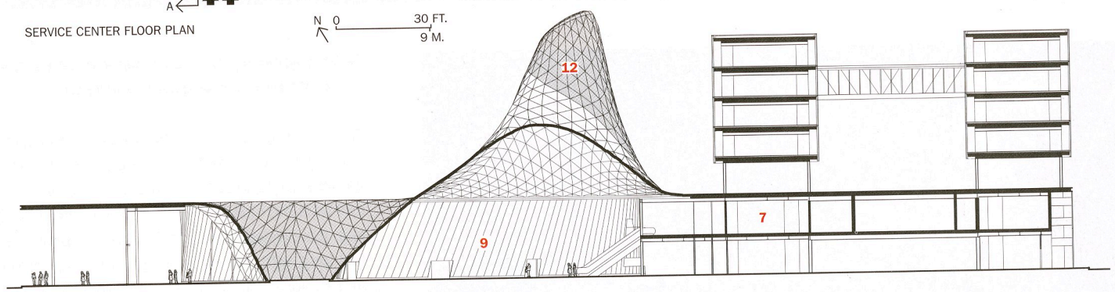


SITE PLAN

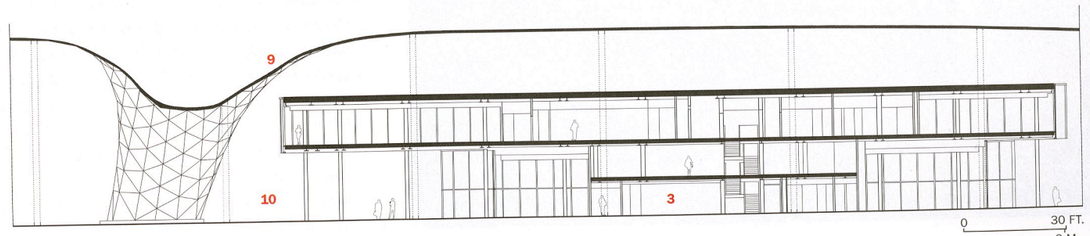


SERVICE CENTER FLOOR PLAN

1. *Exhibition hall*
2. *Meeting space*
3. *Restaurant*
4. *Offices*
5. *Service center*
6. *Entrance hall*
7. *Conference room*
8. *Auditorium*
9. *Technical center*
10. *Canopy*
11. *Walkway*
12. *Entrance cone*

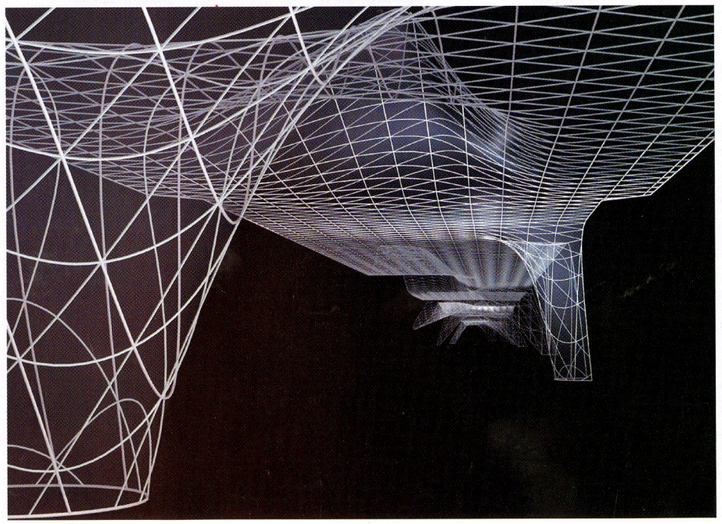


SERVICE CENTER SECTION A-A



SECTION OF WALKWAY RESTAURANT

A conceptual sketch by Fuksas was worked into a model (below), then digitized with Rhino 3D software. Subsequent formal experimentation helped create shapes that appear to be less than solid. Cubic glass and steel buildings near the central axis (left) serve as offices, which look out onto the canopy's tree columns (opposite).



Grid topology and structural behavior of a free-formed glass surface

The so-called *logo* (Italian for symbol) is the section of the glass roof that marks the entrance to the fairgrounds, rising to 121 feet. The *vela* (sail) part of the roof links the individual halls over a length of 4,265 feet. It is divided into 12 regions, each about 328 feet long, with floating fix-points at the tree columns and stationary fix-points at the "turned-down volcanoes," or funnels, in order to control deformation due to temperature changes. The *logo* roof, which is mostly double-curved and completely free-form, calls for triangular meshing for efficient load-bearing behavior as a shell. Both the *logo* and *vela* structures consist basically of welded-steel profiles, with the individual structural elements prefabricated offsite. Most were bolted together, so little welding was required.

Source: International Journal of Space Structures, Vol. 20, No. 1, 2005.

entrance hall, an auditorium, a conference room, and technical rooms. Next come the 20 small restaurants and cafés that line the walkway. These steel-trussed glass structures with wavy facades stand on pillars so that they reach the walkway. The meeting halls, which are designed as small, Gehryesque stainless-steel-clad blobs, hover at walkway level. Office spaces for the Fiera administration, also spaced along the walk, are contained in simple glass and steel boxes.

Below the walkway, at ground level, each building is given its own landscape treatment. The bloblike meeting halls get gravel-lined reflecting pools. The wavy restaurants get bamboo forests. The office buildings, green grass. The effect of this is to create a kind of fantastic wonderland of architecture and a space that is also coherent. You know at once whether you're looking at a restaurant or a pavilion. And although the building overwhelms with its scale—the vista down the walkway is a bit frightening in its awesome size—it is easily understandable.

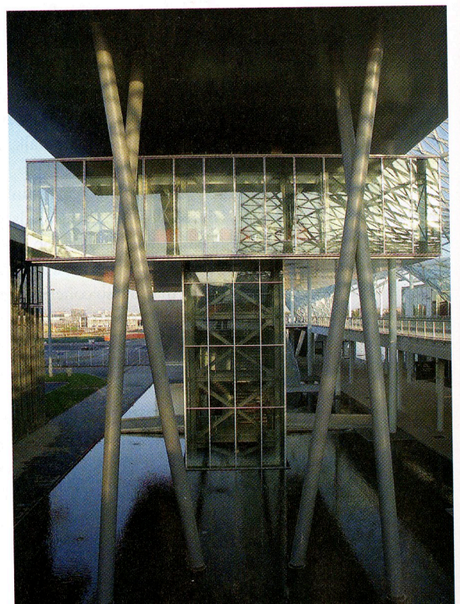
Fuksas confers legibility to the trade-fair structure through the scale and orientation of the buildings. With the exception of a few minor piazzas that eddy off the walkway, everything in the Fiera is oriented toward the canopy, the main axis and a kind of Main Street. The structures placed directly on the walkway (the restaurants and meeting halls) are small, while those set slightly back from it (the pavilions) are much larger.

One advantage that Fuksas enjoys here is the lower value placed on air-conditioning in Italy, which allows him to arrange all these elements not inside a closed space—where they would seem very contrived—but in an open-air landscape. The freestanding canopy never joins any of the buildings, and as it jiggles and wriggles across the site, it creates a thousand different, beguiling intersections between architectural and sculptural form.

The Fiera began life nearly a decade ago when the city of Milan realized that despite the cultural importance of the conventions and exhibitions that it hosted in its fairgrounds—including the yearly furniture show—the city was being rapidly outpaced by others like Chicago and Frankfurt in the global competition for large-scale trade shows. At the same time, the European Union was looking to invest in a brownfields cleanup project in the industrial and postindustrial suburban megalopolis that extends 77 miles from Milan to Turin. The E.U. agreed to clean up a former AGIP gas refinery near a primary highway intersection connecting eastern and western Italy to the northern reaches of Europe if the city would build a $700 million trade-show complex on the space. The cleanup took just over a year and involved substantial removal and chemical cleaning of the soil, before Fuksas was tapped for the design.

According to Giuseppe Blengini, an on-site project architect, the design of the Fiera followed the same process that all of the firm's

Each building is given its own landscape treatment at ground level: Blob meeting halls get gravel-lined reflecting pools (above); the wavy restaurants get bamboo forests; the elevated office buildings, green grass (right). Convention pavilions (opposite) are large (530 x 730 feet) rectangular boxes clothed in polished steel, with generous openings to admit natural light.



projects undergo. It began as a rough, conceptual sketch by Fuksas himself. In this case, the inspiration came from the local landscape, a melange of natural elements (a stream meandering through plains) and some unnatural ones, including a "mountain of steel," emblematic of northern Italy's industrial landscape. This sketch was worked into a model, which was then digitized using Rhino 3D modeling software, a program favored by industrial designers and conducive to sculptural work. Blengini says that the back-and-forth between sketch, model, and computer was repeated dozens of times, with the ever-present Fuksas honing certain details.

Although it looks very complex, the canopy's use of standardized triangular glazing for most of its span made it relatively easy to construct. The entire project was completed in 27 months, lightning-fast in Italian terms. "Making the canopy was the easy part. After the first 328 feet, we went fast," says Fuksas. "The hard part was the vision. The scale is so immense that we never fully comprehended the project until it was done."

A building like the Fiera may never become lovable like so many classic structures of smaller scale. Even a skyscraper has a certain intimacy to it compared with a nearly mile-long exhibition hall in the suburbs. But in the face of this challenge, Fuksas has made a significant contribution, creating a space that is full of wonder. You half expect to see St. Peter at the end of that walkway when you arrive. But it's also comprehensible and, therefore, usable. It gives trade-show goers a much needed respite from the inhumane landscape characteristic of these shows—the miles of cardboard displays, bitter coffee, and bad-joke soliciting that leave one drained after minutes. All along the walkway we find amazing spaces where a building comes close to the canopy in a beguiling dance of unusual geometries or where a vista opens below us of a stainless-steel blob hovering over a reflecting pool bathed in milky light. These are sublimely architectural moments when form, volume, and light offer to lift us out of the banality of the show we might be attending and remind us once again that sometimes buildings can be something more than just the containers of our lives. ■

Sources

Glass roof (central axis, service center): *MERO GmbH*
Curtain walls: *Permasteelisa*
Steel structure: *Icom Engineering; Ask Romein; Carpentieri d'Italia*
Roof components: *Bemo Systems*
Lighting system: *Lampada Lavinia, by Doriana and Massimiliano Fuksas for Guzzini*

For more information on this project, go to Projects at **www.architecturalrecord.com**.