Next in Green Building: Water Walls

Tracy Staedter, Discovery News

Aug. 21, 2007 — While most walls are built from plaster, wood or brick, a team of architects and engineers has designed a structure seemingly supported by sheets of running water.

The Digital Water Pavilion, which will be unveiled next June at the opening of the World Expo 2008 in Zaragoza, Spain, has a computer that manipulates the falling water into patterns of images or messages.

Inspired by the idea of reconfigurable architecture — spaces that can expand or shrink depending on need — the design could also make a point about water and sustainable development, the expo's theme.

"A large fraction of water consumption in the world is due to poor infrastructure management and leaky pipes, for instance, up to 40 percent in places such as Mexico City," said Carlo Ratti, head of the SENSEable City Laboratory at the Massachusetts Institute of Technology.

The water-walled building could make a point about water usage, he said, "by showing how water can be controlled down to the drop level."
A science museum embraces the interactive experience. Get more Discovery News video here.

The framework for the pavilion consists of a steel roof and post-like pistons that lower the roof to the ground when the building is not in use. The structure, housing a cafe and tourist office, will measure 164 feet long, 33 feet wide, and 16 feet high.

When the building is in use, water will spill from a series of closely spaced valves running along a roof-top pipe. Precisely controlled by a computer program, the valves will be designed to open and close several times per second.

Turning some valves off and then on again creates gaps in the falling water. Turn them on and off again in a precise pattern and the spaces can become an image or a word. The entire facade, in fact, will serve as a large display.

The floor will be made of aluminum sponge, an absorptive material often used in the aerospace industry.

Not only will the water be recycled, as it is in a fountain, but as some of the water inevitably evaporates, it will cool the building, thus reducing energy consumption.

"It is a natural cooling system, as in traditional Spanish architecture and as envisioned by other Expo 2008 buildings," said Ratti.

The team also plans to equip the pavilion with technology with proximity sensors — probably cameras with image-processing software — that sense approaching people
and pull apart the liquid curtain to allow them to enter dryly.

"The really interesting part is the water wall," said Jason Johnson, assistant professor of architecture at the University of Virginia in Charlottesville. "I would call this a soft architecture, a liquid architecture that I haven't seen before."

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