

Specialty fabrics Review

Australian architectural firm cools air with stored water

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By Janice Kleinschmidt

One architectural firm in Victoria, Australia, is going a step further in environmental sustainability by using stored water to cool air at a primary school. Water in underground tanks lined with 1mm-thick polypropylene sandwiched between two sheets of geotextile fabric—part of the rainwater harvesting system for irrigation and toilets—will provide a passive geothermal heat exchange through air pipes.

“Water is collected from the roof and stored in cellular tanks underneath the concrete slab of the building,” explains Neville Cowland, director of NOWarchitecture. “Because the tanks have no exposure to UV radiation and are in constant contact with the cold earth, which is also protected by the slab, the water inside them stays at a constant 15 degrees Celsius (59 degrees Fahrenheit). The air pipes that run inside the water tanks have an inlet above ground on one side of the building and a series of floor vent outlets that are cast into the slab. When the temperature inside the building is higher than the temperature outside, a natural drawing effect is created. As air is drawn through the pipes, it is cooled by the water, which has four times greater heat exchange than earth or concrete.”

Next month, NOWarchitecture will turn over the newly built, seven-building complex to Meadows Primary School in Melbourne. The novel project has already sparked interest from the sustainability research department of the University of Melbourne, which has sought permission to allow its Ph.D. students to study the system’s performance. NOWarchitecture is monitoring the old school building to create a baseline comparison.

Cowland conservatively estimates the system will last 50 years. “UV radiation is the prime reason for degradation of plastic products,” he notes. “Because the parts are not exposed to any light, there will be no wear.

“Australia is a dry continent,” he continues. “As our population increases, there is a corresponding increase in demand on our already stretched water supply. As such, we anticipate that the demand and market for water storage can only increase. And allied with population increase is the increased value of space, so systems that can be installed underneath structures may become even more attractive.”

Janice Kleinschmidt is a freelance writer based in Palm Springs, Calif.



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