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3 Beautiful, Ancient Passive Cooling Techniques in Modern Architecture

Posted on 05. Mar, 2012 by [Maryruth Belsey Priebe](#) in [Articles](#)

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We've talked in the past about ancient architectural ideas in modified for modern contexts, like the [earth sheltered passive house design](#). If you like that, check out these three amazingly beautiful passive cooling techniques developed centuries ago that are seeing a rebirth in today's green building scene. We're sure they could be adapted for [green house plans](#) with a little ingenuity and creativity.

Stepwells for Natural Air Chilling

A stepwell – also known as bawdi/baoli (Hindi), barav (Marthi), as well as other ancient names – is a small body of water that is created either below ground or surrounded by walls above ground. As the water evaporates in an enclosed area, it cools adjacent spaces. In modern architecture, this is often accomplished by filling the body of water with recycled (filtered) grey water.



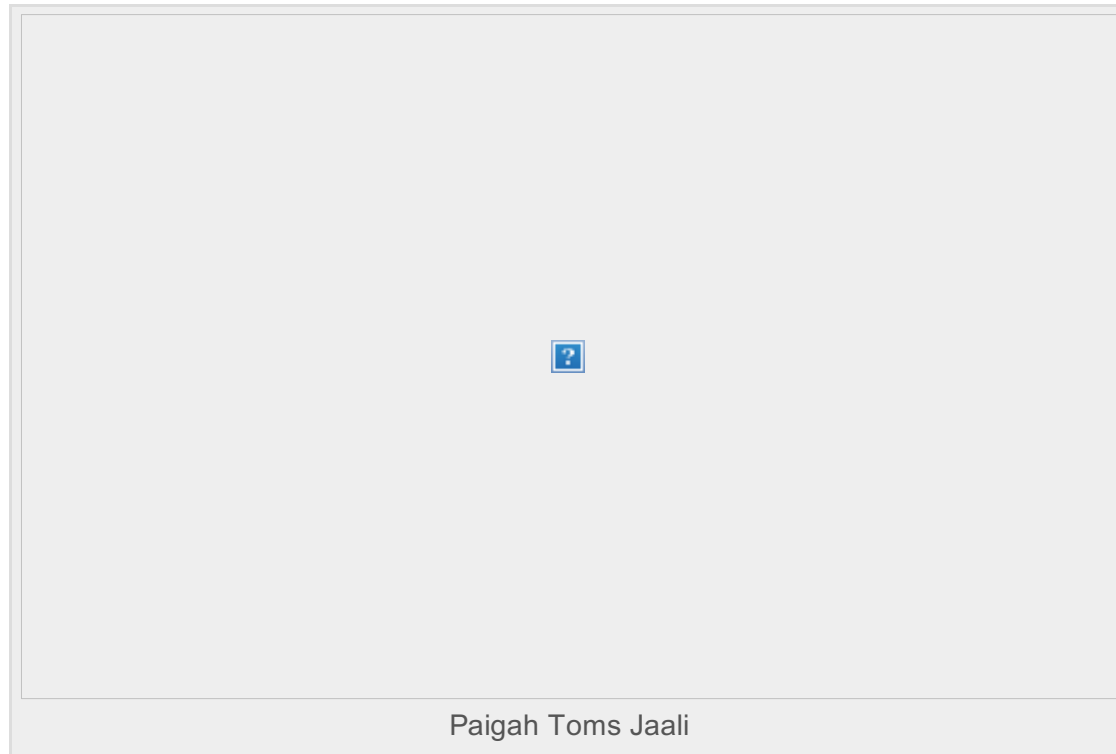
Amir Chakhmaq Mosque Windcatcher

Windcatchers for Natural Indoor Breezes

Known alternately as wind chimneys, cooling towers, badgir (Persian), barjeel (Arabic), wind towers, and even solar chimneys, windcatchers are just as the name suggests – architectural towers that “catch” the wind to create natural air flow inside buildings. Used extensively throughout the Middle East, windcatchers function in one or more of three ways:

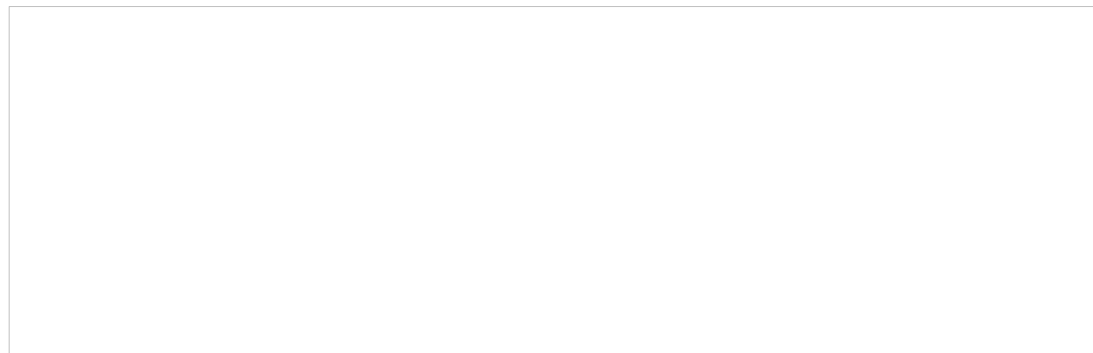
- Wind enters the chimney directly through a tall, capped tower with an opening to the prevailing wind, creating a downward flow of air.
- Dense hot air escapes out of the tunnel, while cool air from below fills the void, creating a natural indoor breeziness.
- Hot air is pulled in through a qanat tunnel, which is then cooled in an underground space (sometimes with the use of water), which forces air in an upward motion through the tower.

All three methods could easily be adapted for residential designs.



Perforated Double Skinned Exterior for Passive Cooling

Cladding the exterior of a building with a perforated screen like those called jaali in Rajasthani architecture is another highly effective passive cooling technique. Doing so allows natural daylight to diffuse through to provide illumination but shades the indoor spaces to avoid overheating. By putting four feet between the outer and inner walls of the building, natural air circulation is also created.





Using Ancient Ideas in Modern Architecture

You can see many of these ancient passive cooling techniques at work in modern architecture these days. For instance, the [Pearl Academy of Fashion, Jaipur, India](#) makes use of the jaali as well as a modern version of the stepwell to cool the indoor spaces. This is especially important given that the average daytime high in the region is 45 degrees C or 113 F.

Images via Flickr:

Amir Chakhmaq Mosque Windcatcher: [reibai](#)

Chand Baori Stepwell: [selmerv](#)

Paigah Toms Jaali: [Nagarjun](#)

Pearl Academy perforated screen & stepwell: [Morphogenesis](#)



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