

Passive Design is Not Passive at All



BY **PAUL KELLEY**

Prior to the 1800s, most rural structures were built to orient to a southern sun exposure. But as towns formed, building orientation turned to face the street. Until the 1940s, building design focused mostly on maximizing natural daylight and ventilation through the massing of the structure, window openings and built-in shade devices, such as wide overhangs and wraparound porches. With time and innovation, the building form has become less reliant on the environment for natural light and ventilation, and more dependent on technology and non-renewable energy sources for building comfort. A look to traditional practices, however, can save both energy and money.

As the earth rotates, the sun appears low in the winter sky, while rising much higher in the summer. This means southern building exposures are ideal for letting in natural daylight. Daylight is different from sunlight: You want to limit exposure to daylight during the summer months while enjoying the warming effect of direct sunlight during colder months. Western exposures should be avoided where possible to avoid late-day sun exposure.

Theory is great, but what about buildings that are stuck with street-facing orientations and western fenestration? Consider these tips below when designing “new” passive spaces:

- **Add a porch.** A porch addition can prevent direct sunlight from entering through windows in the summer.



- **Update your glazing.** If you decide to replace windows, keep in mind that glazing is specified based on its U-factor (resistance to heat loss), heat gain or solar heat gain coefficient, and daylight visible transmittance. Look to professionals for assistance replacing windows based on orientation and existing conditions.

- **Add toplighting** to bring needed light to remote spaces. Light tubes are perfect for this application, as they transmit daylight instead of sunlight. Well-placed roof windows or vents allow heat escape on cooler summer nights.

- **Insulate.** This is a powerful tool for controlling the indoor environment. Spray-foam insulation both adds significant R-value and seals spaces to prevent air transmittance, which is more critical than the actual insulation thickness.

- **Plant vegetation.** Foliage (like that show above over a porch) can help keep the surrounding ambient temperatures of your home lower, and shade walls, roofs and window surfaces during mid-day and late afternoon. Plantings in south and west yard areas should be deciduous, so the leaves drop in the winter, allowing warm sun rays in.

These “passive” recommendations are anything but. No additional energy is expended to warm or cool your home. And the best part is that there are no moving parts. Old school is cool.

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