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Lightning and Wind Turbines

Q. We have installed a 1935-vintage Jacobs wind generator (1500 watts; 32 volts dc) on an island in Wisconsin. Since the 55-foot tower is on a hill in the middle of a lake, it gets hit with lightning all the time. We have a standard panel box but an electronic charging control. The tower has a lightning arrestor and a ground rod. Each time lightning hits, it destroys an integrated circuit and a couple of transistors. How can we prevent even small charges from the lightning from going into the panel box? What effect does lightning have on batteries when it passes through them?—Richard Amrhein, North Oaks, Minn.

A. You should probably put surge suppressors on every wire entering your panel box. They should be grounded to your existing ground rod. Never use separate ground rods for different parts of the same installation. The ground rod or stake should make better contact with moisture in the earth than do the tower footings; since your machine is on a hill, you might want to check this (on a sunny day). Installing a lightning rod at the top of your tower isn't likely to protect your electronic equipment further and may not be cost-effective because the rod may interfere with the wind's flow around turbine blades.

Lightning passing through your batteries could be expected to destroy them by means of a powerful explosion. But the lightning may be inducing transient surges in the batteries. It is doubtful that they cause any harm. Engineers we spoke with stressed that generic answers aren't universally right. Since lightning has a deadly potential, show your installation or an accurate diagram of it to a qualified electrical engineer.

Stuccoing over High-R Insulation

Q. "In-Town Solar Condos: One Developer's Plan Book" (*Solar Age*, 9/83) includes mention of an exterior insulation system for masonry walls using 2-inch urethane under stucco. I have had little success locating such a system in Phoenix that uses polyurethane and not polystyrene. Can you supply me with information on a polyurethane system or any other exterior insulation system that might give me a better R-value than 2-inch polystyrene?—James Hoffman, Tempe, Ariz.

A. First, a clarification—strictly speaking, the rigid insulation used in the La Vereda Compound (the subject of the arti-

cle) was a foil-faced polyisocyanurate (Thermax™), not a polyurethane. Ann MacKinnon, office manager of La Vereda developer Communico, says that the company often uses Thermax over concrete block and under stucco, as do most builders in the Santa Fe area. Wire stucco lath is placed over the insulation and attached to the masonry below with concrete nails. MacKinnon says "a builder in Santa Fe who didn't know and use this technique would probably be out of business" because demand is high for adobe-like finishes. She adds that lath and stucco can be used over sprayed-on urethane as well.

See InspectAPedia.com/Energy/Termite_Shields.htm

Thwarting Termites

Q. Several articles in your magazine have mentioned using polystyrene board as perimeter insulation on a slab and covering it with stucco or millboard to protect it. Building officials in my area won't let me stucco over Styrofoam™ or cover it with anything else for fear that termites will come up between the insulation and the stucco or through the insulation and attack the framing. Any suggestions?—Ken Downs, Redding, Calif.

A. Termiticide, not a termite shield, is the solution recommended by Jerry Severson, who heads research into foundation insulation at Dow Chemical Company's Granville Research Center, in Granville, Ohio. Termites can burrow through many building materials, including all forms of insulation, and no mechanical guard offers complete protection. Those who advocate using termite shields say that they slow down the pests so that the homeowner can spot their telltale air tubes and take action against them.

Termite poisons improperly applied to the soil under a house can give off fumes that enter the home heating system and make occupants sick. To avoid this, hire a reputable local pest control expert who is fully aware of the house's HVAC design. Also, make sure that the termiticide in the soil is not one of those that can harm exposed insulation materials around the foundation.

Address questions about articles in Solar Age to Q&A, Solar Age, Church Hill, Harrisville, N.H. 03450. If you want a reply, enclose a self-addressed stamped envelope, and a member of our staff will respond. Questions of general interest will be printed in the magazine.

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