Oceanside Decking

Q. *I'm building a wharf on a bay of the Gulf of Mexico. It is to be on 8-inch-diameter pilings with 2-by joists and cross-members. Can I use plywood for the decking? What are your recommendations?*

A. *Mike Shannahan, a master carpenter in La Porte, Texas, responds:* Plywood would not be my choice for the decking; even treated plywood can have problems with delamination when used in the open on a project like the one you describe. Plywood would also be at a disadvantage in the harsh wind and high water conditions that occur during tropical storms and hurricanes: The "lift" on 4x8 sheets could wreak havoc on framing connections and bearing members when wind and wave action team up on your dock.

I would use 2x6 or 2x8 decking of pressure-treated Southern Pine (.60-retention) nailed in place with 20-penny hot-dipped-galvanized spikes. Space the deck boards 3/4 inch to 1 inch apart to allow plenty of room for movement and for water to flow through during storm tides. All heavy members below the deck — cross ties, stringers, joists, and so forth — should be bored and through-bolted with hot-dipped-galvanized or stainless-steel fasteners.

Some excellent publications on the marine use of Southern Pine are available from the Southern Forest Products Association (P.O. Box 641700, Kenner, LA 70064; 504/443-4464). Good luck.

Mechanical Plumbing Vents

Q. *I saw a "rubber diaphram" device marketed as a cap for vent pipes that terminated in the attic. Its advantage was that it did not pierce the roof (highly desirable for expensive roofs like slate and tile), yet it would work to equalize pressures in the vent system. No mention of noxious gases or additional ventilation requirements was mentioned. Do these devices work, and are they accepted by the most common plumbing codes?*

A. *Master plumber Rex Cauldwell responds:* The device you refer to is called an air admittance valve, and was invented by Sture Ericson in Sweden more than 25 years ago. Since then, millions have been sold worldwide by the manufacturer, Studor. According to Studor, the air admittance valve can effectively replace a through-the-roof vent pipe.

Here's how it works. The valve keeps the system closed until it senses negative pressure within the drain system, such as behind a pipe filled with running water. The pressure pulls the rubber diaphragm down as long as the system needs air, then a spring reseats the diaphragm.

The Studor vent can be installed out of sight, beneath a counter or in a wall or attic. However, most inspectors I know will red-flag an in-the-wall installation. Some will not allow the device at all, so always check with your local inspector before installing one.

I commonly use Studor valves when it is either very expensive or downright impossible to run a daylight vent pipe. I'll also use them for supplementary air in a kitchen or in an existing house that needs more vent air. Although Studor advertises that the system can completely replace the through-the-roof venting system, I prefer to have at least one large-diameter air vent to the outside to provide a way out for positive pressure that might build up in the lines.

For example, I was recently in a home where every time the clothes washer drained, it would blow the trap water and even the strainer right out of the kitchen sink. The washer was upstream from the sink, and the slug of washer water was shoving air ahead of it because the drain line was too small and didn't allow for any vent air. The air admittance valve installed in this home in lieu of an open air vent could not prevent this problem, because it only reacts to negative pressure, not positive. I'm sure Studor would comment that such things wouldn't happen if the drain systems were designed properly to begin with. And they would be right — the long 1 1/2-inch unvented washer drain line was against all codes.

Still, even with properly sized drain lines and air admittance valves, I would always include an outdoor vent pipe somewhere in the system as a backup measure. For more information on Studor vents, see www.studor.com.

Floor Truss & Girder Question

Q. *A while ago you ran an article recommending that you limit deflection of built-up wood girders to L/600 so that the floor joists wouldn't vibrate excessively (see* Practical Engineering, *8/97). My question: Does this also apply to steel girders, or is it mainly a wood-related issue, owing to the inherently greater flexibility of wood beams? In another words, would a steel beam sized for L/360 deflection be less bouncy than a wood beam sized for, say, L/480? Or should I absolutely make sure that all my steel beams are size for the L/600 limit?*

A. *Authors Frank Woeste, P.E., and Dan Dolan, P.E., respond:* The forces that induce floor vibration and the reaction to it are blind to the beam or girder material. Each girder material, whether wood or steel, has an elasticity, E, and that design value is used to predict deflection. The designer sets limits on live-load deflection. A wood beam and a steel beam both designed to exactly meet the L/360 deflection limit should perform the same, assuming the weight of the girders themselves has been accounted for and that both are fastened securely to their support points.

Considering the price of steel (and the cost to repair a bouncy floor), you should upgrade all girders to meet a live-load deflection limit of L/600 if vibration is a sensitive issue for your clients.