Thinner decking not always adequate

By Bob LaCosse

The growing use of 15/32-inch plywood and non-veneered products (known generically as oriented strand board, waferboard, wood particleboard and comply) as roof decking has led some roofing material manufacturers and roofing contractors to question the strength and performance of these products. Some of the roofing industry's concerns have already been addressed. Underwriters Laboratories (UL) investigated and found that the use of 15/32-inch plywood would not adversely affect a roofing system's fire resistance classification. UL has also said that, according to its test results, oriented strand board, waferboard, wood particleboard and comply are suitable substitutes for 15/32-inch veneered plywood as roof deck material for roofing systems that are UL classified or UL listed for resistance to external fire.

But questions still remain about the suitability of these products for use with steep or flat roofing. Some roofing manufacturers have even circulated letters advising their customers that they would only guarantee jobs using plywood with a 1/2-inch thickness.

Panelized system needs strength

Daniel H. Brown of the American Plywood Association (APA) has submitted a letter to NRCA clarifying APA's position on the use of these products. The text of this letter is reprinted in full below.

"The familiar 4-foot-by-8-foot panel used in roof deck construction has stronger properties in the 8-foot direction than in the other. That's why in conventional construction the long panel dimension is always placed at right angles to the framing—that is, across framing. In this application, the panel ends rest on framing and the 8-foot side joints are unsupported unless there is 2 x 4 blocking or panel clips at those locations.

Buildings must be designed to resist wind and earthquake forces. The most common method in the Western states for doing this is to consider the roof sheathing along with the framing members as a huge, flat 'I'-beam, known as a diaphragm. The panel sheathing functions as the web of the beam and boundary members function as the flanges. The three model building code groups—the Building Officials & Code Administrators, the International Conference of Building Officials and the Southern Building Code Congress—have accepted this method and specify the design values to be used for the panels.

The greatest diaphragm strength with this system is achieved when all panel edges are supported by framing. Therefore, the panels can be applied either conventionally, with solid lumber blocking under all panel edges, or the panels can be installed with their long dimension parallel to 2-by framing with the end joints supported by larger additional framing, 8 feet on center. This latter system is called the panelized system, or is sometimes referred to as the Berkeley system. With this system, the roof is erected in large sections using a crane. The sections typically measure 8 feet by 20 feet or 8 feet by 24 feet or other sizes.

In this application, the short dimension is perpendicular to the framing. It is therefore necessary to examine the strength of the panel in the weaker of the two directions; that is, in the 4-foot direction. For this reason, panels that are entirely adequate in the conventional application may not be at all suitable when used in the panelized system. A case in point is three-ply, 15/32-inch or 1/2-inch plywood carrying a span rating of 32/16. This panel is entirely adequate when used in the conventional system with framing at 2 feet or up to 32 inches on center. However, in the panelized system for the 2-foot framing spacing, it is not recommended. The minimum panel for this application would be a four-ply or five-ply, 15/32-inch or 1/2-inch panel, depending on the roof live load in the area where the building is being built.

Non-veneer panels, like oriented strand board and waferboard, also have strength properties that are different in the two directions, so a panel that is adequate for one panel orientation may not be correct for the other.

APA published a residential and commercial design/construction guide that gives information on these applications. The guide also describes the difference between conventional and panelized systems. This literature is available from APA at P.O. Box 11700, Tacoma, Wash. 98411."