OSB: Job-Site Report

by Larry Schmukler

Oriented-strand board is strong and economical, but make sure you keep it out of the rain

Our company currently uses oriented-strand board (OSB) for both subflooring and roof sheathing. Previously we used 3/4-inch pine plywood on floors and 3/8-inch pine plywood on roofs (fir plywood costs too much for our budget). The switch to OSB saves us money – almost $1 a sheet – but we made the switch primarily because we think that OSB is a better product. In this case, we're getting better quality and a lower price.

We think OSB makes a stiffer floor, so we figure it also makes a stiffer roof. Just be careful when you buy your OSB that you're getting rated oriented-strand board (see "An OSB Primer," facing page).

Spans and Specs

For flooring, we use 23/32-inch tongue-and-groove OSB, which is equivalent to 3/4-inch plywood. For roof sheathing, we use 7/16-inch OSB, which is equivalent to 1/2-inch ply. Since we mainly build townhouses, we use the OSB on the roof between FRT plywood panels that go above each firewall.

Under carpet we don't use underlayment, but under sheet goods, we put down a 1/4-inch underlayment of plywood or hardboard (see Figure 1, facing page). In kitchens, baths, and foyers which get ceramic tile or marble, we use 1/2-inch plywood underlayment on top of the 23/32 OSB subfloor. (We use a thinset mortar for tile rather than mud.)

The American Plywood Association (APA) says you can space your joists 24 inches on-center, but the tile installers recommend 16 inches (see the chart "Subflooring Guide," last page). So we'll generally space the joists 24 inches except under kitchens, baths, and foyers where we use tile or marble. Regardless of the spacing, I prefer to use manufactured floor joists over 2x8s or 2x10s. There's more strength, less deflection, and no knot holes to give way.

Spacing is Critical

On subflooring, a lot of crews are used to just giving a panel a whack with a hammer to drive it tight, but that's the worst thing you can do with OSB. Although the material is very dimensionally stable, after one or two good soakings, the edges can swell. So we're careful to adhere to the manufacturer's spacing recommendations – 1/8 inch on the tongue and groove sides and 1/8 inch on the butt ends. The butt edge is reduced 1/6 inch to help you maintain the space. Some makers have also reduced the size of the tongue to help spacing. So, even if you drive it in, there's still a little room to breathe.

The OSB we use on floors and roofs is exterior grade, and is supposed to take several soakings. But to some extent, that may be an exaggeration. Occasionally, a batch gets one soaking, and within two weeks we have delamination. Once we had swelling that had to be sanded down with a belt sander. This, however, happens rarely – maybe a couple of times in hundreds of applications.

On the roof, we use clips to space the panels. Some builders use clips in only one direction. However, we like to use them in both directions – on both vertical and horizontal joints. We place three or four on the long edge, and two on the short (see Figure 2).

Limit Exposure

To avoid problems, there is one cardinal rule: Get the project under the protection of a roof. The carpenters have to push to get the roof sheathing

In some areas, OSB is replacing plywood as the leading choice for roof sheathing and subflooring.

An OSB Primer

by Gary Mayk

Increasingly each year, U.S. builders are buying OSB products to replace plywood in subfloors and roof sheathing. In some regions, it has become the predominant sheathing material.

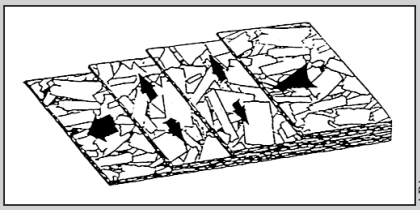
A big reason is price. OSB sells for about a dollar a sheet less than comparable pine plywood. The savings are even greater compared to fir plywood. Generally, manufacturers take OSB prices up and down with the price of plywood, keeping OSB somewhat cheaper.

OSB is cheaper to manufacture because it is made from wood products that are abundant and grow quickly. To make OSB, logs are cut into wafer-like strands; aspen is often used. With dwindling supplies of the big relatively knot-free logs that normally go into making plywood, OSB is likely to continue taking more of the structural panel market in the 1990s.

square-shaped strands placed randomly. OSB was stronger. Over the last few years, however, nearly all waferboard manufacturers have begun to orient their fibers to give their product greater strength. At this point, according to engineer Ed Keith at APA, "waferboard and OSB are really the same product. The shape of the particle is no longer important." What is important, says Keith, is to make sure that the panel is performance-rated by APA or another recognized third-party testing organization.

OSB is commonly available in thicknesses of 3/8, 7/16, 1/2, 19/32, 5/8, 23/32, and 3/4 inch. Tongue-and-groove panels typically have a 47 1/2-inch net width on the top surface, but this varies by manufacturer. Some manufacturers are also cutting 1/8-inch off the tongue to help counter swelling problems.

Although it's made of small wafers, OSB's strength characteristics are closer to five-ply plywood. APA tests show that OSB is actually stronger than some plywood. For the same thickness, OSB is 10% stronger across its surface than four-ply plywood or composite-core-plywood. It is 20% stronger than three-ply plywood. All three panels rate the same in stiffness.



The strands in oriented-strand board (OSB) are cross-laminated to give it strength.

Laminated Strands

Plywood is made from softwood veneers as big as the board itself, but OSB is made from hundreds of water-like strands of wood. During manufacturing the wafers are oriented mechanically or electronically so the grain is aligned in each layer (see illustration). The layers are arranged as the plies are in plywood – cross-laminated, perpendicular to one another.

OSB face strands typically run with the 8-foot length of the panel. The strands are compressed into a three– to five-layer board with phenolic resin or isocyanurate adhesive. This makes OSB about 10% heavier than plywood of comparable thickness.

Many builders are confused about the difference between OSB and waferboard. At one time the difference was clear: OSB had long, narrow strands that were oriented and waferboard had

Reading the Label

The American Plywood Association (APA, P.O. Box 11700, Tacoma, WA 98411; 206/565-6600) writes standards for the oversees the manufacturing of both plywood and OSB made by member mills.

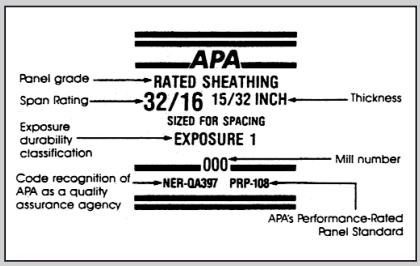
APA-associated mills rate their sheathing products by performance, rather than by thickness or material type. So any two panel products that test out the same get the same span rating and can be used interchangeable. Thickness is not a reliable indicator since many factors, including wood quality, number of plies, and manufacturing methods, all affect strength. One company's 1/2-inch product may get the same span rating an another's 5/8-inch panel.

Span ratings for APA panels are in the label printed on every sheet (see sample this page). The span ratings are separated by a slash, with the roof span on the left and the floor span on the right. For example, a span rating of 32/16 means a maximum floor span rating of 16 inches.

The label also shows the exposure grades.

- Exposure 1 is formulated to withstand exposure to the elements during prolonged construction delays. It is the common builder's panel for roof sheathing, subflooring, and wall sheathing. It uses the same glue as exterior-grade plywood, but lacks the exterior grade because it lacks exterior plywood's C-grade veneers.
- Exposure 2 is formulated only for moderate exposure to the elements. Exposure 2 is rarely found in lumberyards, Keith says. It makes up less than 5% of the market.

Keith, an engineer with the APA, says the plywood is the only exterior-grade sheathing intended for permanent exposure to the elements. "None of the non-veneer products are rated exterior," he says.



How to read an APA label. *"Exposure 1" is the grade. The numbers "32/16" represent the span rating; the maximum roof spacing is to the left of the slash, and the floor spacing is to the right. The small fraction, "15/32," indicates the panel thickness. The words "sized for spacing" indicate the panel is slightly undersized to allow a gap all around for expansion. The numbers that break the solid line are the manufacturer's mill numbers.*

Roof Installation

For thinner panels at wider spans, metal clips are required to keep OSB (or plywood) from sagging at unsupported horizontal joints. For most standard residential practices, clips are not structurally required, but some builders use them anyway – as a spacer and for the added rigidity.

If you are using the clips for spacing, make sure you use special spacer clips – designed to give you a 1/8-inch gap (to allow for swelling). A standard clip will only space the panels the thickness of the steel – about .024 inch. For butt joints directly over rafter, a 10d nail tapped temporarily in place can do the job as well as a spacer, according to Keith.

Subfloor Tips

To nail, "use a ring-shank or deformed-shank 3d nail that just barely penetrates the surface of the subfloor," Keith says. Underlayment should run perpendicular to subflooring and doesn't have to butt above joists. The 3d ring-shank nails are sufficient to secure it to the subfloor.

As subfloor, Keith says, OSB sheathing can be installed with or without glue. But he highly recommends glue for added stiffness and protection form squeaks.

Gluing underlayment, however, is a different story. "Underlayment should never be glued," Keith says, although many builders prefer to glue and screw it to the subfloor. One problem is that construction glue may not flatten when applied from a tube. "The glue lines may telegraph through the underlayment," Keith cautions. The correct glue is a water-based wood glue spread over the entire surface, which is no good wherever you may get moisture in the floor, he says.

"Also, it's not practical," Keith says. For example, if you're moving a refrigerator and damage the underlayment, replacing the glued underlayment panel will probably require replacing the subfloor too. "Once it's glued, it's permanent," he says.

Gary Mayk is editor of the eastern edition of The Journal of Light Construction.

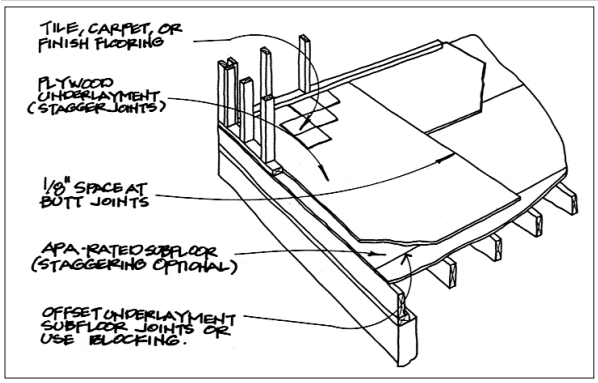


Figure 1. *OSB subfloor layout.* *Joist spacing may vary according to the span rating of the subfloor, but ceramic tile should always be supported 16-inches on-center. Underlayment, when used, should be laid perpendicular to subflooring. It is nailed with 3d ring-shank nails to the subfloor, and panel joints need not fall on joists. Underlayment joints should stagger with subfloor joints to avoid telegraphing subflooring joints to the floor covering.*

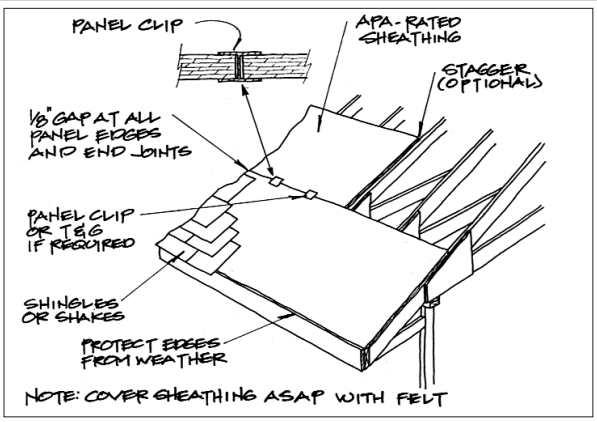
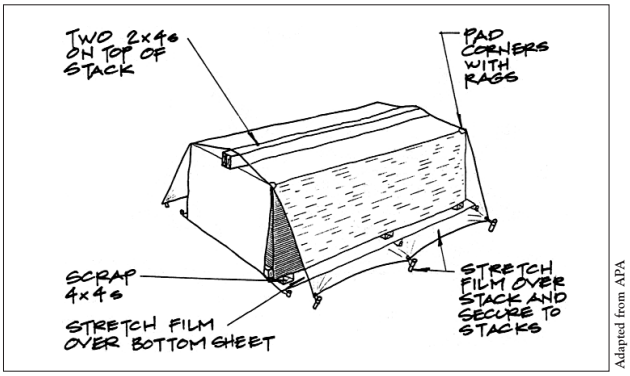


Figure 2. *OSB roof sheathing.* *For longer spans and thinner sheathing products, clips are required on unsupported horizontal joints to help keep the material from sagging. Some clips are designed to space panels at 1/8 inch as well as to stabilize.*

Subflooring Guide (APA-Rated Plywood or OSB)

Panel Span Rating	Panel Thickness (inches)	Nail Size	Nail Spacing (inches) Supported Panel Edges	Nail Spacing (inches) Intermediate Supports
24/16	7/16	6d common	6	12
32/16	15/32, 1/2, 5/8	8d common	6	12
40/20	9/16, 19/32, 5/8, 3/4, 7/8	8d common	6	12
48/24	23/32, 3/4, 7/8	8d common	6	12

Note: *For a given panel, the span rating, not the material or thickness, determine its use. In general, however, you can replace plywood with the same thickness of OSB.*



Adapted from APA

Figure 3. ***On-site storage.*** *APA recommends moisture-resistant storage if the panels will be exposed to the elements for a prolonged period. The platform rests on 4x4s placed at the center and 12 to 16 inches from the ends. Plastic covers the platform and the stack of panels — first lengthwise, then over the width. Pad the corners with rags and tie down the poly cover to stakes.*

and the paper on as quickly as possible. Once you put felt paper on the roof, you've virtually home free; you won't need shingles right away.

To protect your subflooring, you also want to either set the windows in place right away or cover the openings with plastic. The important thing is to keep the OSB dry.

Glue It Right

On the subflooring, we don't block under the joints where panel ends meet, but squeaky floors are a concern. Therefore, we nail and glue all subflooring. We find that nails have little to do with the problem. Nails are just there to hold the subfloor until the glue sets. For glue, we use Goodrich PL400 or Franklin International construction adhesive. For $20 or $30 worth of glue, you can save yourself a lot problems. The alternative is a callback, which can be prohibitively expensive. You may have to go back and rip up carpet and walk the floor to find a squeak.

Builders have many problems with gluing; they should pay more attention to the glue application. For starters, don't cut the tip of the glue cartridge at just one angle: you have to cut it from both sides so it's tapered to a point at the top. That way, you can't help using an ample amount of glue

Glue not only on the joists, but also on all joints – and not just the butt joints, but also the long joints. And use more glue! Get in there and jump up and down to make sure you've got a solid floor.

Handling

We like to limit deliveries to the day the sheathing will be installed. But for practical reasons, sometimes deliveries arrive for two or three projects at once. We try to store the panels the way the manufacturer recommends – on 2x4s or 2x6s, with plastic to keep out ground moisture, and plastic over the top to keep off rain. Don't place a bundle on just two or three 2x4s. Place enough support underneath to keep the stack from bowing (see Figure 3).

As for cutting, carbide blades are the way to go. Some of our subs just send their blades to an in-house sharpener more often. Some complain about the resin, but it's not a real problem. In fact, with most homes dimensioned in multiples of 4 feet, complaints about cutting subflooring or roof sheathing are greatly exaggerated.

In general, we get good results with OSB. If I were going to improve the product, I'd make sure that all four edges were sealed by the manufacturer. And I'd really get the word out about spacing. ■

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