

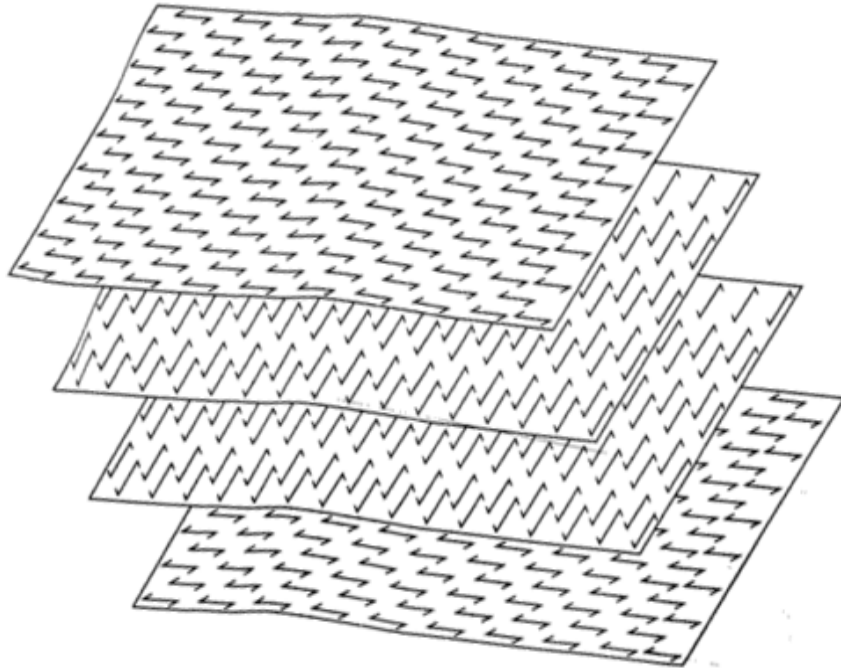
# TECHNICAL SOURCE GUIDE

## ORIENTED STRAND BOARD

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Oriented Strand Board or OSB is an often overlooked building product that is suitable for adoption in the theatre. These panels have excellent strength and a cost about half that of the equivalent softwood exterior plywood panels commonly used in scenic applications. Typical theatrical uses for 1/2" to 3/4" thick sheets are as sub-flooring in platforms, stairs and ramps. Though somewhat heavier than lauan plywood, thinner panels might find use as backing for walls and other vertical surfaces.

The manufacturers of OSB, as represented by the Structural Board Association, note that OSB is a structural panel composed of strands cut from aspen, poplar, or southern yellow pine. The individual strands, each about 1" wide by 4" long by 1/32" thick are sliced from the logs in the direction of the grain. The strands are dried, blended with wax and waterproof exterior type binders (generally phenolic resin), then formed into a loose mat or pad usually containing four or five layers. As demonstrated in the illustration below, the outside strand layers are oriented along the length of the panel, thus giving the panel its primary strength in that direction. The strands in interior layers are oriented either randomly or perpendicularly to the outside. The entire mat is then pressed into a rigid dense structural panel which is then cooled and trimmed to size.



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There are important advantages to using an engineered wood product such as OSB:

- It utilizes logs not typically suitable for structural applications when sawn as standard lumber or plywood veneers.
- The environmental savings of using fast growing wood species are substantial and no costlier than traditional plywood manufacture.
- The engineering methods used in this product ensure a highly consistent product with regards to strength and stability.

OSB panels are generally rated as roofing/sheathing or sub-flooring, making practical application nearly identical to that of plywood. When specifying OSB (as opposed to wafer-board), check the grade stamp to ensure that it meets the American Plywood Association (APA) performance standards for Rated Sheathing and Rated Sturd-I-Floor. For technical designers needing to calculate deflection of panels, note that the Structural Board Association's standard requires that panels have a Modulus of Elasticity of 800,000psi in the direction parallel to the grain and 225,000psi perpendicular. Values for shear stress through the OSB panel thickness are about twice that of plywood. This excellent performance in shear is a primary reason why residential stress-skin panels and the webs of wooden I-joists are fabricated from the product. Typical loading values as published by one manufacturer, the Louisiana Pacific Corporation, when framed at 24 inches on center are:

Thickness (inches)	Maximum live load (lb/in2)
3/8	30
7/16	40
15/32	70
1/2	70
19/32	130
23/32	175
1-1/8	290

Some scenic shops have been resistant to the use of this product over standard softwood exterior plywood for several reasons. The seeming similarity to the older and structurally inferior wafer-board is one of these. Wafer-board is constructed from fewer layers of randomly oriented roughly rectangular wafers of wood.

Though this alignment gives the panel a uniform strength in all directions it allows only two-thirds the strength of an OSB panel of equivalent thickness. The reluctance to embrace the more efficient product is certainly not unique to theater; according to Paul Fiset of the Building Materials and Wood Technology program at the University of Massachusetts:

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"The issue for most builders who choose between plywood and OSB is durability. OSB looks like, and is, a bunch of wood chips glued together. Detractors of OSB are quick to say: "OSB falls apart." This opinion has a familiar tone. Plywood suffered the same criticism not too long ago. Delamination of early plywood sheathing gave plywood a bad name. Many "Old-timers" swore by solid board sheathing until the day they hung up their aprons. Not many builders share that view today."

- Durability problems with OSB in residential construction have largely been limited to repeated or excessive exposure to moisture, a problem we are unlikely to encounter in most theatrical applications. Long-term durability is not necessarily of the greatest concern for most scenic uses where production runs of eight to ten weeks are considered long. The greater density of the finished material is certainly a consideration, but the weight of a 3/4" panel is 78 pounds, only about 10% greater than that of a comparable sheet of plywood. The surface finish of an OSB panel is not as fine as that of a sanded plywood panel, but is certainly acceptable as sub-flooring or platforming under a painted hardboard/Masonite show deck. OSB manufacturers can, however, supply sanded panels as a special order.
- The use and availability of OSB will only grow with time in residential, commercial, and theatrical construction. Certainly the savings in cost as well as to the environment that this product will help drive that growth. This is already a consistent and reliable construction material, but what ensures the long-term viability of the product in the market are the rigorous performance standards to which the manufacturers must comply.

Thank you for taking time to read this "classic" Technical Source Guide! Because it has been published a relatively long time ago, addresses (physical & web) and any phone numbers, might not be current!

Technical Source Guide #30 – ORIENTED STRAND BOARD

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