



FACT SHEET

COMPONENTS: SHEATHING

Description

Exterior sheathing is used in frame or panelized construction to join and stabilize the structure while providing a surface for weatherproofing and the exterior finish materials. Sheathing is a critical structural component that connects framing members or panels to provide lateral bracing and to withstand wind and building loads. The following comparative analysis identifies the relative economic, energy, and environmental implications of three exterior sheathing options: exterior plywood, exterior oriented strand board (OSB), and exterior gypsum.

Recommendations

- Use locally or regionally manufactured wood products to reduce transportation and increase community economic benefits. Exterior oriented strand board is manufactured within 500 miles of the metro area (closer to outstate areas)
- Use materials which maximize rapidly renewable resources. Exterior oriented strand board uses fast-growing aspen and waste products; however, use materials from FSC-certified producers to ensure growing and harvesting sustainable practices and prevent ‘plantation’ grown products
- Use less toxic materials. When selecting composites (OSB), use formaldehyde-free products to protect workers and installers from the effects of dust and off-gassing
- When sheathing may be exposed to the elements for up to six months, choose fiberglass-faced gypsum sheathing for durability. Select products with synthetic gypsum to reduce overall material resource use

Citations

Forest Stewardship Council (FSC): www.fscus.org A third-party certification organization established to promote sustainable growth and harvesting practices throughout the world's forests.

Sheathing Alternatives

alternatives	cost	energy	IAQ	expected product life	life cycle thinking	practice
exterior plywood	typically more expensive	0.5" R = 0.5-0.62	no significant effects	15-20	typical	standard
exterior OSB	typically least expensive	0.5" R = 0.5-0.62	no significant effects	20-50	good	standard
exterior fiberglass faced gypsum	typically more expensive	0.5" R = 0.5	no significant effects	25-50	typical	standard

Criteria Summaries

Cost: OSB is typically the least expensive option for exterior sheathing. However, recent fluctuations in the wood product market and increased demand have driven prices for OSB and plywood up. A report by the NAHB Research Center in September of 2003 stated prices for plywood and OSB at \$19.85 for a 4' x 8' sheet, and exterior gypsum at \$15.68. Currently, there is no clear or consistent low cost recommendation. Cost will continue to depend on market forces and local availability.

Energy: Wood products have 10-20% greater thermal resistance (higher R-values) than gypsum products. However, they require more additives to provide fire resistance than gypsum products.

IAQ: Potential for out-gassing in the building: Because these are exterior products and will be enclosed by other materials, their effects on the indoor environment are minimal. Issues related to exterior sheathing focus on production and end use with little operational impact.

Expected Product Life: All of these products suffer deterioration if exposed to excessive moisture. Products which do not support mold-growth (non-paper faced gypsum board) or high-content resin panel products (OSB) provide a longer lasting construction. Protection against water-penetration or exposure improves product performance over time.

Life Cycle Thinking: Evaluate materials on the following:

- Energy consumption (especially non-renewable, fossil fuel energy): Wood products require significant amounts of energy for processing and drying; gypsum products require more energy throughout every phase of their production.
- Pollutants generated in production: Plywood produces the least amounts of pollutants during harvesting and production, while OSB produces the most. Production of OSB generates considerable pollutants that can affect workers in production facilities.
- Durability of the product: If protected against moisture, both during construction and through the operational life of the building, gypsum sheathing and OSB have the longest life cycle. Plywood, because it can delaminate, is most susceptible to moisture exposure at all stages of its use.
- Potential for future recycling: Plywood has the most direct reuse potential, primarily because it can be downcycled one more step before being landfilled or used for fuel. However, in locations where gypsum board can be recycled into a soil amendment, it has the least long-term detrimental effects. Use of finishes, sealers, and coatings can increase negative impacts when sheathings are recycled or composted.

Practice: All of the sheathing products follow standard practice. The most significant changes related to sheathing involve alternative construction methods that preclude the use of sheathing or allow for less structurally significant products when not required for strength or stabilization.

Environmental Context

Wood is a readily available commodity product. However, the methods by which is it grown and harvested have significant impacts on the environment. Plantation planting degrades habitat and leads to monoculture, which creates the potential for widespread damage due to disease or natural disasters such as drought and fire. It also requires widespread pesticide use to maintain the health of the crop. Traditional forestry practice permits massive clear-cuts, which can damage water quality and reduce biodiversity. If not locally produced, there are increased impacts on air and water associated with transportation.