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ABSTRACT:

Medium Density Fiberboard (MDF) products are plentiful and manufacturers are constantly developing adaptations to current building trends. This article compares solid wood standing and running trim to similar products made of MDF, and explores the implications for using both materials.

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REFERENCES:

ANSI A208.2 Medium Density Fiberboard for Interior Applications
AWI Architectural Woodwork Standards

Interior Woodwork - Wood vs. MDF

By Jay Bethel, CSI, CDT, SCIP

Background

Medium Density Fiberboard (MDF) has been available for many years. MDF manufacturers have developed products to compete with solid wood. This article will focus on standing and running trim products and will examine some differences between the wood and MDF products.

Plywood panels were developed as a way to economize by using less desirable wood remnants (referred to as "residual" wood). The family of panel products including, particleboard and oriented strand board (OSB) were invented to further the economy realized by plywoods. Eventually, MDF joined the fold as an even more efficient product. To make MDF, wood chips are reduced to cellulose fibers that are combined with resins and wax, and then molded together under heat and pressure.

Moldings, such as baseboards, crown, casings, and other specialties, have been wood, traditionally. Exotic wood species and more common hardwoods such as mahogany, maple, oak, walnut, and cherry maintain the top of the quality chart for transparent finished woodwork. Many of the paint-grade wood products have MDF competition.

Wood vs. MDF

Under the AWI Architectural Woodwork Standards, MDF is considered a panel product not lumber. AWI rates MDF superior to wood for flatness, visual edge, and

surface uniformity. Wood is superior to MDF for bending strength, only. AWI permits MDF for opaque finished woodwork for Economy, Custom, and Premium Quality Grades.

1. Appearance- Wood comes in a variety of quality levels, often with beautiful grain suitable for clear finishes. MDF is a uniform color, usually a shade of brown with no grain and a smooth exterior, although embossed finishes are available.

2. Surfaces- Wood will have natural characteristics such as knots and pitch pockets that make consistent finishing difficult, and can have open coarse grain that telegraphs through finishes. MDF does not have these characteristics and offers a uniform, smooth surface.

3. Exposure to Water- Both wood and MDF are susceptible to damage from water, particularly chronic contact with water. MDF tends to deteriorate faster when in contact with water. Wood tends to warp, cup, and change dimension.



4. Humidity- Wood is highly susceptible to changes in humidity, MDF less so. It is best to keep wood in an environment maintained between 30% and 65% relative humidity (10% to 15% moisture content in the wood) to minimize the dimensional changes. At RH greater than 65% dimensional changes for wood are significantly more than for MDF. Remember these factors:

- MDF changes dimensions equally across the width and along the length.
- Wood dimensions change across the grain not along the length.
- Plain (tangential) sawn lumber will change twice as much as quarter (radial) sawn lumber.
- Wood changes vary by species.

5. Sustainability- Most wood products are harvested from well managed, renewable sources (FSC Certified Wood). Sawing lumber from trees generates waste. MDF makes use of entire trees. MDF can be made from 100% recovered wood fiber.

6. Workability- There is less waste when using MDF as opposed to wood, especially for standing and running trim. Lengths of wood will be selectively reduced to remove imperfections before installation. MDF moldings have no such defects and are 100% usable.

MDF is easily milled to produce clean surfaces and many products come pre-primed, with a surface composition that is compatible with high quality finishing techniques. MDF can be finished with a variety of paints, including acrylics and alkyds. Catalyzed lacquers and varnishes are incompatible with the adhesives in the MDF material.

7. Costs- Due to the use of "scrap"

and recovered wood fiber as raw materials, MDF products are generally less expensive than solid wood products.

8. Jobsite Use- Both wood and MDF products must be allowed to acclimate to the project site conditions prior to installation.

MDF Variations and Properties

Manufacturers of MDF products are constantly developing variations and improvements to meet industry requirements. MDF is made from cellulosic fibers which include different types of wood materials, and agrifibers such as wheat, barley, and other cereal straw (also called bagasse).

A variety of different resin formulations are used resulting in a variety of products ranging from heavy, plywood-type panels, to light weight, eco-friendly materials.

Manufacturers produce MDF products with no added urea formaldehyde, independently certified 100% pre-consumer recycled content, FSC certification, and Class A fire retardant rating. MDF products are sustainable and contribute to the following LEED Credits:

- MR 4 Recycled Content
- MR 7 Certified Wood
- EQ 4.4 Low Emitting Materials- Composite Wood

MDF standing and running trim is available with printed laminate films applied to the exposed surface to simulate a transparent wood finish. With careful detailing and installation

craftsmanship, these trim materials can replace solid wood so the general public will be unaware of the substitute material.

Conclusion

Wood will not be replaced by MDF type materials because wood has a value, texture, and appeal that cannot be completely recreated by man-made materials. Many common uses of wood do pose some questions about conservation and sustainability, such as the depletion of rainforests, the lifespan of many wood products, and the "carbon footprint" of construction projects.

While MDF is not a perfect substitute for wood and is not the only choice as a replacement for wood, MDF is a viable, economical replacement in many applications. In addition, with the constant societal pressure to develop increasingly sustainable materials, MDF is well represented in the overall selection of materials that contribute to sustainable design, resource conservation, and construction affordability.

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