AIA Best Practices:
Criteria for choosing wood flooring

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Summary

Before selecting wood flooring, it is important to determine whether the wood's characteristics and anticipated durability will mesh with the flooring's intended use and location.

Basic considerations

Wood flooring should be selected after considering pedestrian and vehicular (cart) traffic, durability required, potential damage to floors, typical use, exposure to moisture and sunlight, maintenance, appearance expectations, and other project-specific criteria.

Most of the woods specified for commercial flooring are hardwoods such as oak or maple. Best overall appearance, uniformity of color, limited amounts of character marks, and minimal sap marks indicate the most desirable wood flooring.

Flooring can be manufactured from practically every commercially available species of wood. For marketing purposes in the United States, wood flooring is roughly grouped according to species and region. Various grading systems are used with various species, and specifications often differ for boards of different sizes in a given species. For instance, recommended nail size and spacing vary among the board sizes typically available in oak.

Grade classifications vary, but in each case it can be assumed that the first grade listed is the highest quality and that the quality decreases with each succeeding grade. The best grade typically minimizes or excludes features such as knots, streaks, spots, checks, and torn grain, and will contain the highest percentage of longer boards.

Grade standards have been reduced in recent years for most commercially produced flooring, hence a thorough review of exact grade specifications is in order when selecting wood flooring.

Wood characteristics

Annual growth rings are visible in the wood and vary in color and density. Growth rings, when exposed by sawing methods, provide the grain and pattern in the wood flooring. In hardwoods, plain-sawn lumber generally contains mostly flat-grained wood, while quarter-sawn lumber is nearly all vertically grained.

Figuring is the pattern produced in a wood surface by annual growth rings, rays, knots, and deviations from regular growth.

Medullary rays extend radially from the core of the tree toward the exterior bark. They vary in height from a few cells in some species to 4 inches (100 mm) or more in the oaks and are responsible for the flake effect common to the quarter-sawn lumber in certain species.

Tangential grain is typically called plain sawn or flat grain. It is easily recognized by its parabolic (arched) effect.

Lumber is considered flat-grain when the annual growth rings make an angle of less than 45 degrees with the wide surface of the board.

Radial grain is known as quarter sawn, vertical grain, or edge grain. It is generally more stable than flat grain and less likely to expand or contract in width with changes in moisture. Lumber is considered vertical-grained when the annual growth rings form an angle of 45 degrees to 90 degrees with the wide surface of the board.

Durability

Durability of wood flooring varies with the wood species and the finish selected. Hardwoods such as oak and maple typically perform better than softwoods, such as pine. Not all hardwoods are suitable for wood flooring. The wood species hardness and the cut of the wood flooring affect its ability to resist indentation, wear, and marring.

Wood-strip and plank flooring is quarter-sawn (edge grain) or plain-sawn (flat grain) and typically is milled into a tongue-and-groove shape. Quarter-sawn strip flooring is considered to be more durable due to the exposure of the vertical grain of the wood. It is also more expensive than plain-sawn wood, as more waste wood is generated. Rift-sawn strips are generally associated with oak flooring. It is also costly, as there is more waste than from quarter-sawn wood strips. Jointed or square-edged flooring is also available. End-grain wood blocks are durable flooring units, installed in a jointed fashion.

Wood is a hygroscopic material that changes dimensionally with the absorption or release of moisture, causing swelling or shrinking. After manufacturing, wood flooring is kiln-dried at the factory to a moisture content of 6% to 9%. At the project site, the flooring must be protected to maintain proper moisture content and acclimatize to the space, which should be of the manufacturer's recommended environmental conditions for installation. Before installation, provisions should be made for movement of the flooring at the perimeter of the wood floor. The relative humidity of the space and the moisture content of the wood are also factors, as is the moisture content of a concrete substrate.

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