

Specifying the Right Wood Flooring for the Job

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 - IDC
- AIA/IDCEC does not endorse content
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Course Description



This seminar explores how to specify the right wood flooring for a successful installation. Architect and design professionals will become more familiar with wood and its use as a flooring material in an effort to properly specify the correct product for their client projects.

Learning Objectives



- Describe how wood differs from other flooring options
- Understand the different types of wood flooring available
- Explain how each type of wood flooring will perform based on where it is installed
- Discuss the impact of radiant heat systems & other extreme conditions on wood flooring



Wood as a Flooring Option



Wood as a Flooring Option



- Wood is renewable
- Other flooring options are not
- Trees are a natural resource
- Trees regenerate
- No replanting required
- No human intervention needed



Sustainability



- USDA Forest Service
 - 1.6 trees planted per tree harvested
 - Standing volume more than double since 1950s
 - Responsible forest management
- 40-60 years to mature
- National Association of Home Builders
 - Wood floors last 100+ years
- Inventory not needed for 40-60 years
- Rapidly renewable for life cycle



Life Cycle Inventory



Sapling



Mature Tree



Finished Product

Environmental Impacts



- Renewable flooring material
- Sustainably managed forests in North America
- Low environmental impact
 - Factory: forest naturally regenerates raw material
 - Sun: renewable energy source
- Carbon neutral
 - Produce oxygen during growth
 - Store carbon during service life
- Less water, energy used manufacturing
- End of service = fuel, recycled
- Last 100+ years
 - Less replacement, raw material





- Improves indoor air quality
- US EPA
 - Wood doesn't harbor allergens, microorganisms
 - Doesn't collect dust, animal dander, outdoor pollutants, etc.
- Low VOC colorants, finishes
- US formaldehyde laws
- Research your supplier

Wood as a Flooring Option



- Low VOC, formaldehyde emissions
- CA = CARB
- CARB establishes strict VOC regulations
- Model for rest of country
- Reviewing for federal standard

Wood as a Flooring Option

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Tile



Carpet



Laminate



Wood Flooring Types



Types of Hardwood Floors

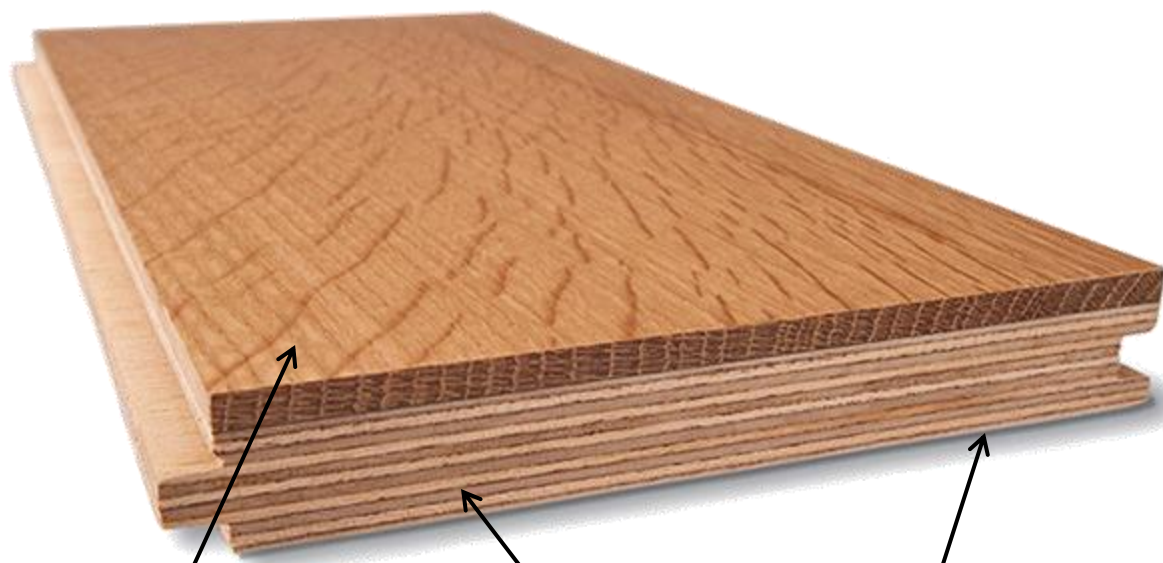


- Solid
 - Solid wood top to bottom



- Engineered
 - Several layers of wood veneer/slats bonded together with an adhesive

Engineered Construction



Wear Layer

Core Layers

Backing

- Top layer = wear layer
- Wear layer is species selected
- Lower layers = core, backing
- Core, backing layers can be same species as wear layer, different species, composite material

Solid vs. Engineered



- Solid can be resanded, refinished numerous times
- The “sandability” of engineered depends on wear layer thickness
- Solid cannot be installed below grade
- Engineered can be installed above, on, below grade
- Because of their cross ply construction, engineered floors are more dimensionally stable
- Engineered can be installed on wood, concrete subfloors
- Solid can be installed on wood subfloors, on concrete subfloors if recommended by the manufacturer

Wood Flooring Types



Solid



Engineered

Saw Cuts



- Plainsawn
- Quartersawn
- Riftsawn
- Livesawn



Plainsawn



- Traditional choice
- 2"-3" boards
- Red oak most common
- Homes built early to mid 1900s



Plainsawn



- Series of parallel cuts
- Remaining cuts perpendicular to first set
- Produces wider boards than rift, quartered
- Board length varies



Plainsawn



- Board face has “cathedral” grain
- Contains flat-grain, some vertical-grain
- Contains more variation within, among boards than other cuts
- End grain growth rings between 0-45°

Quartersawn



- Vibrant flecks
- Tight, wavy grain
- Flecks caused by medullary rays
- Medullary rays are trees' life veins
 - Transport sap from pith to outer parts of tree
 - Perpendicular to growth rings
 - Parallel to board surface
 - Pronounced in white oak



Medullary Rays

- Medullary rays perpendicular to growth rings
- Annual growth rings appear as circles
- Medullary rays appear as vertical white lines from roots to leaves



Growth Ring →

Medullary Ray →

Medullary Rays

- Several cuts possible
- Quartersawn annual rings grow perpendicular to surface, medullary rays grow parallel to surface
- Medullary rays create fleck effect
- Pronounced in white oak

Medullary Rays



Quartersawn



- Quarter the log
- Remaining cuts perpendicular to growth rings
- Produces narrow boards
- Vertical grain
- More waste



Quartersawn



- Board face has fleck pattern
- Contains tight, wavy grain
- End grain annual growth rings 45-90° to surface



Riftsawn



- Similar to quartersawn
- Accentuated, vertical grain
- Minimal fleck
- Saw angle adjusted for fewer cuts parallel to medullary rays
- Produces more waste



Riftsawn



- Quarter the log
- Remaining cuts from center face, work out
- Boards 30-60° to growth rings
- Comes from smaller part of wedge, produces more waste
- Hard to produce only wide-width rift



Riftsawn



- Board face has vertical grain
- Contains minimal fleck
- End grain annual growth rings 30-60° to surface

Livesawn



- Combination of plainsawn, quartersawn, riftsawn





- First cut straight through log's center
- Remaining cuts parallel to first
- Yields extremely wide boards
- Produces very little waste





- Board face growth rings work from parallel in center to perpendicular at edges
- End grain annual growth rings 0-90° to surface

Livesawn



- Allows more fleck effect
- Wider planks show more knots holes, natural characteristics
- Saw blade marks show
- Rustic look increasingly popular



Livesawn



- Wider boards
- Random widths
- More fleck
- More knot holes, character marks
- Saw blade marks
- Natural beauty shows through



Performance



- Wood is hygroscopic
- Absorbs, loses moisture depending on environment
- Swells = moisture gain
- Shrinks = moisture loss
- Direction of movement based on growth rings



Plainsawn



- Expands, contracts through width
- Less dimensionally stable

Quartersawn



- Expands, contracts through thickness
- More dimensionally stable

Riftsawn



- Expands, contracts through thickness
- More dimensionally stable



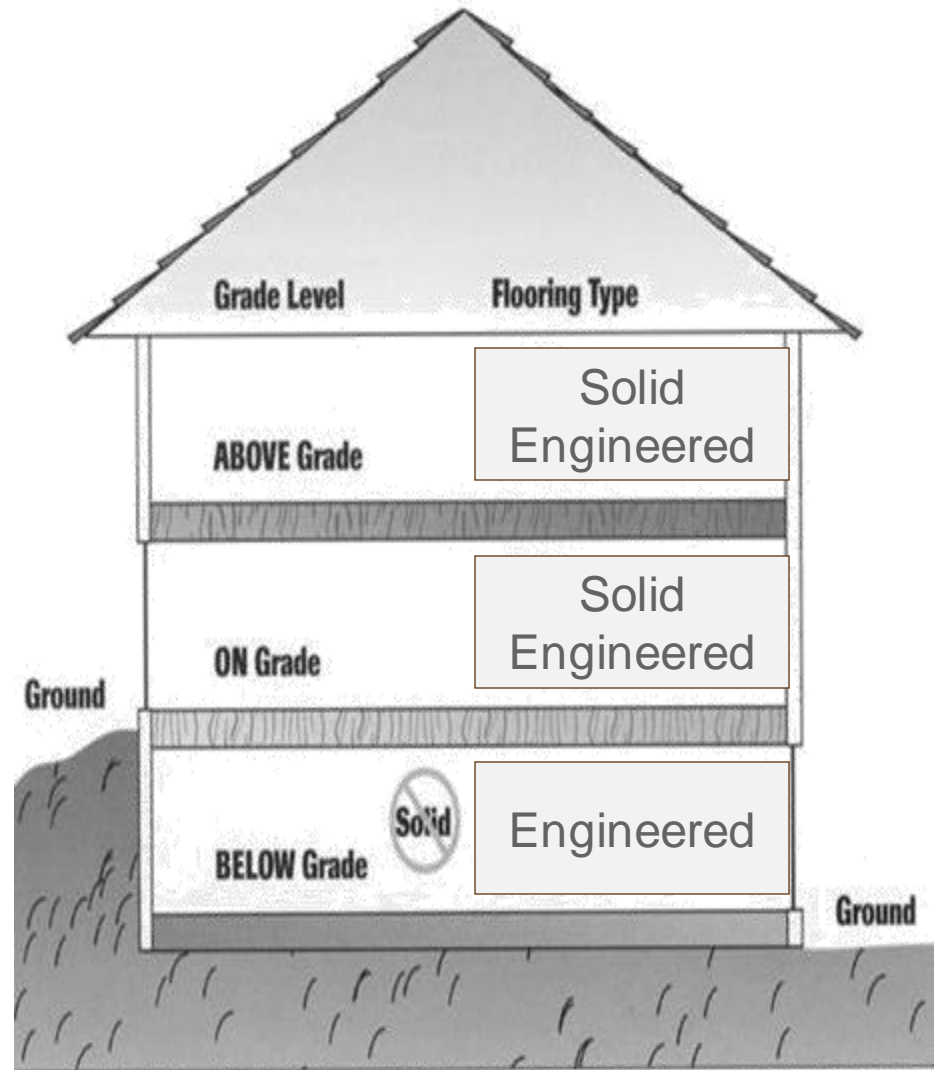
Job Site Performance



Job Site Elevation



- Solid
 - Above grade
 - On grade
- Engineered
 - Above grade
 - On grade
 - Below grade
 - Soil ≤ 3 " above floor



Job Site Conditions



- Windows installed
- HVAC installed, running
- Wet trades completed
 - Masonry
 - Drywall
 - Tile
 - Painting
- Introduces moisture to environment
- Can affect wood flooring



Subfloor Conditions



- Wood or concrete
 - Flat
 - Clean
 - Dry
 - Structurally sound



Acclimation



- Wood flooring must acclimate to job site
- Normal living conditions
 - 60-80°F
 - 30-50% RH
- Acclimation can take several days, months
 - Species
 - Thickness of wood
 - Environmental conditions



Installation Method



Nail-down

- Wood
- Solid, engineered



Glue-down

- Wood, concrete
- Engineered, solid if recommended



Floating

- Wood, concrete, existing flooring
- Engineered





Radiant Heat & Extreme Conditions



Radiant Heat



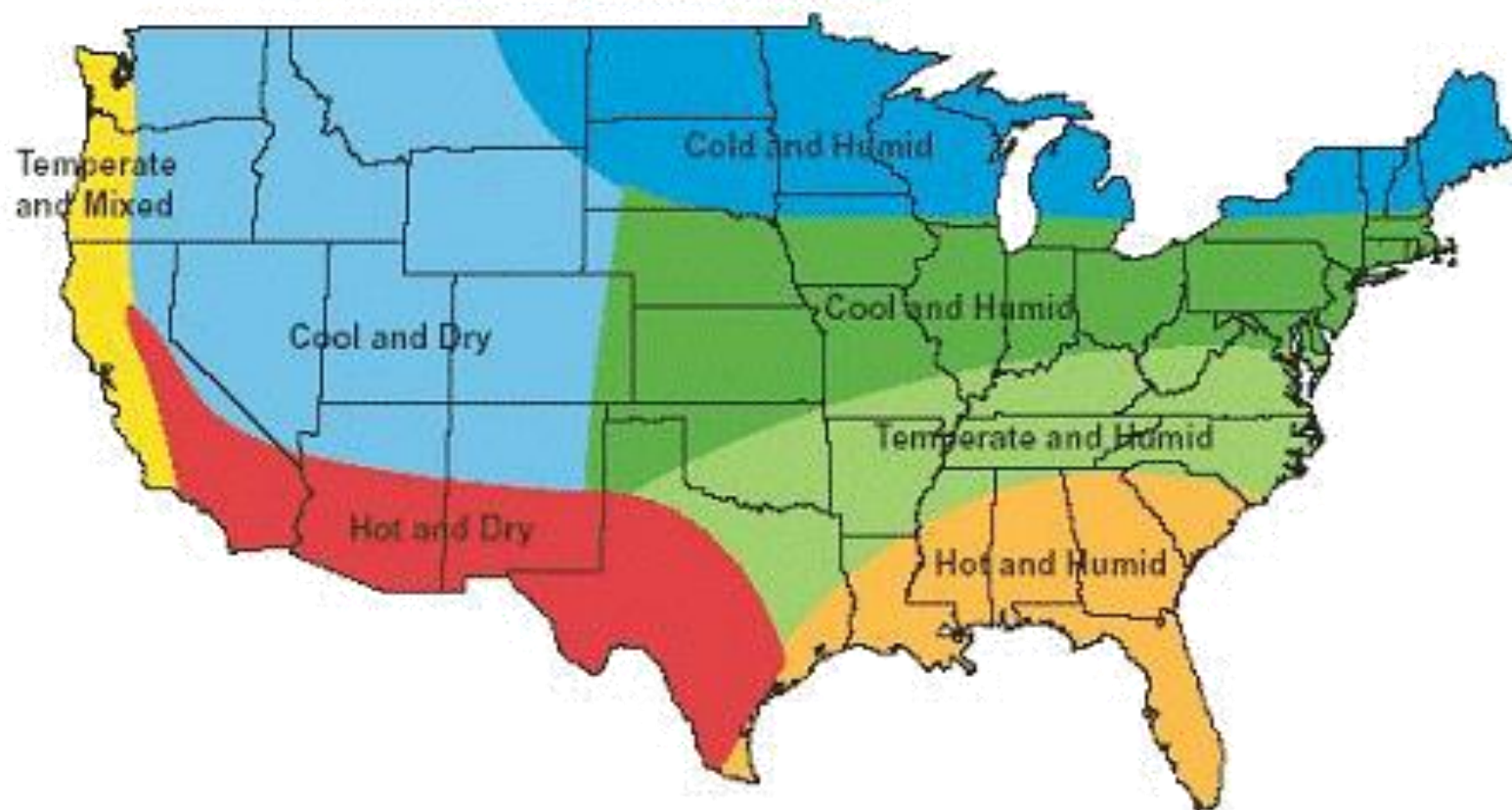
- Heat source directly under floor
- Super-efficient system
- Poses challenges for wood flooring
 - Expands with moisture
 - Contracts without moisture
- Wood can dry out faster than convention heating systems
- Supplemental humidification typically required
- Recommended
 - Engineered
 - Dimensionally stable species
 - Quartersawn, riftsawn
 - Narrow boards



Extreme Environments



- Humid areas = expansion
- Dry areas = contraction



Extreme Environments



- Temptation to specify engineered
- Not always best solution
- If manufacturer specifies 30-50% RH, material won't perform well in area with 15-30% RH
- Follow manufacturer guidelines

Summary



- Wood is renewable raw material that regenerates
- Wood floors can last 100+ years
- Uses fewer natural resources than other flooring options
- Laminate flooring is not made using wood
- Saw cuts include plainsawn, quartersawn, riftsawn, livesawn
 - Cut affects appearance, performance of wood
- Flooring types include solid, engineered
 - Solid wood floors should be installed only above, on grade
 - Engineered wood floors can be installed above, on, below grade
- Wood floors should be acclimated to job site
- Installation methods include nail-down, glue-down, floating
- Radiant heat, other extreme conditions, can affect floor performance

Thank You



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A photograph of a bedroom interior. The floor is made of dark wood planks. On the left, a bed with a white and grey plaid sheet is visible. In the background, there is a dark nightstand with a lamp and a white curtain. The text "Questions?" is overlaid in white on the floor.

Questions?