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National Wood Flooring Association

Designing with Wood Floors

Presented By: First Last
March 15, 2019

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    - IIDA
    - IDC
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- Questions answered at end of presentation

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Course Description

This seminar analyzes the use of wood flooring as an element of design. Design professionals will become more familiar with wood floors as a design material in an effort to properly specify the product that will perform best in their client projects.

Learning Objectives

- Understand the history of wood floors
- Discuss the different types, species of wood floors
- Explain how cut affects both the appearance, performance of wood floors
- Describe the advantages, maintenance of wood floors

Foundation of Design

Characteristics of Wood

- Organic material
- Responds to environment
- Changes over time
- Proper expectations important to performance

History

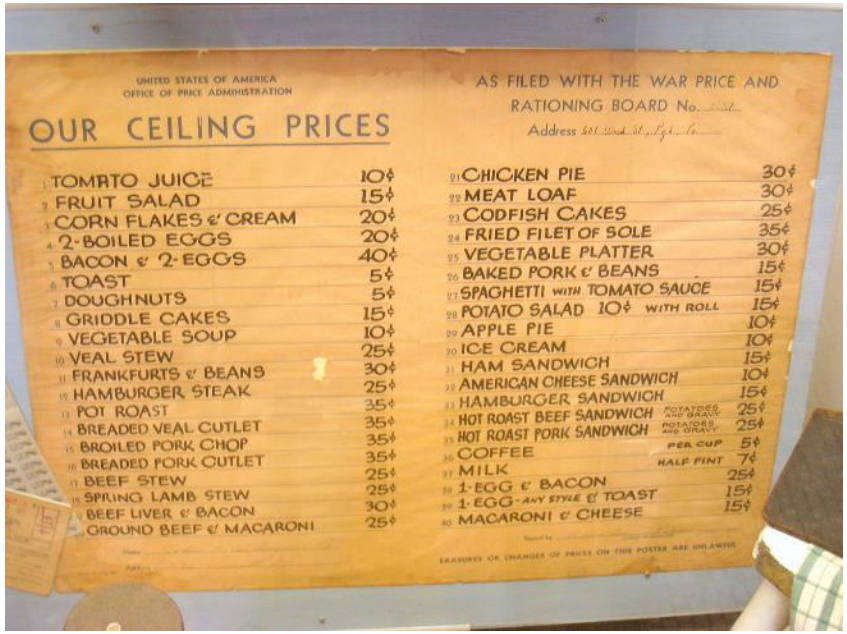
Pre 1900s

- Hardwood floors were only enjoyed by royals, upper class individuals
- Intense labor done by expert craftsmen
- A craftsman would work on 1 floor for years

Turn of the Century

- Side matcher appears in 1885; leads to development of tongue & groove
- End matcher appears in 1898
- Until the end matcher arrived, ends of each flooring board were on joists; subfloors not common

World War II



- Factory finished flooring became prominent
- Office of Price Administration fixed prices on products so individuals could not profiteer during war; factory finished floors considered different product, so installers able to get better price
- Housing for shipyard workers, factory workers flourished; wood flooring installations increased significantly

Current Day

- Diversified market
- Install on wood subfloor, concrete slab
- Numerous species, both domestic, imported
- Finishes impacted by EPA VOC regulations
- GreenGuard, FSC certifications increase environmental awareness

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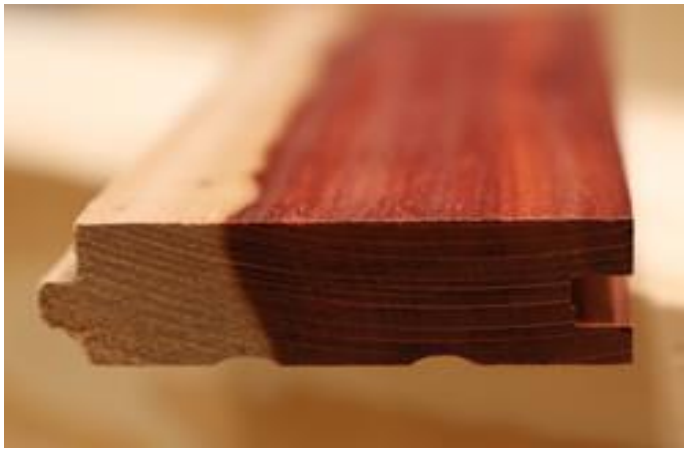
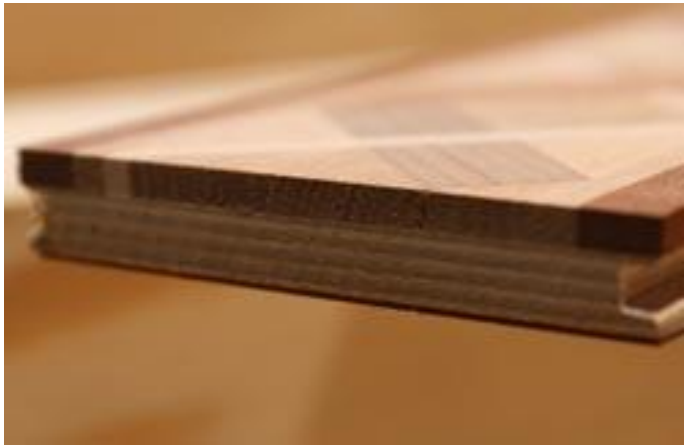
Types of Hardwood Floors

Types of Hardwood Floors



- Solid
  - Solid wood top to bottom



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

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

Styles of Hardwood Floors

- Strip
  - Widths < 3”
- Plank
  - Widths ≥ 3”
- Parquet
  - Geometric; varies in style, width

Finish Methods

- Jobsite finished
  - Finish is applied on the jobsite
- Factory finished
  - Finish is applied at the manufacturing facility

Species

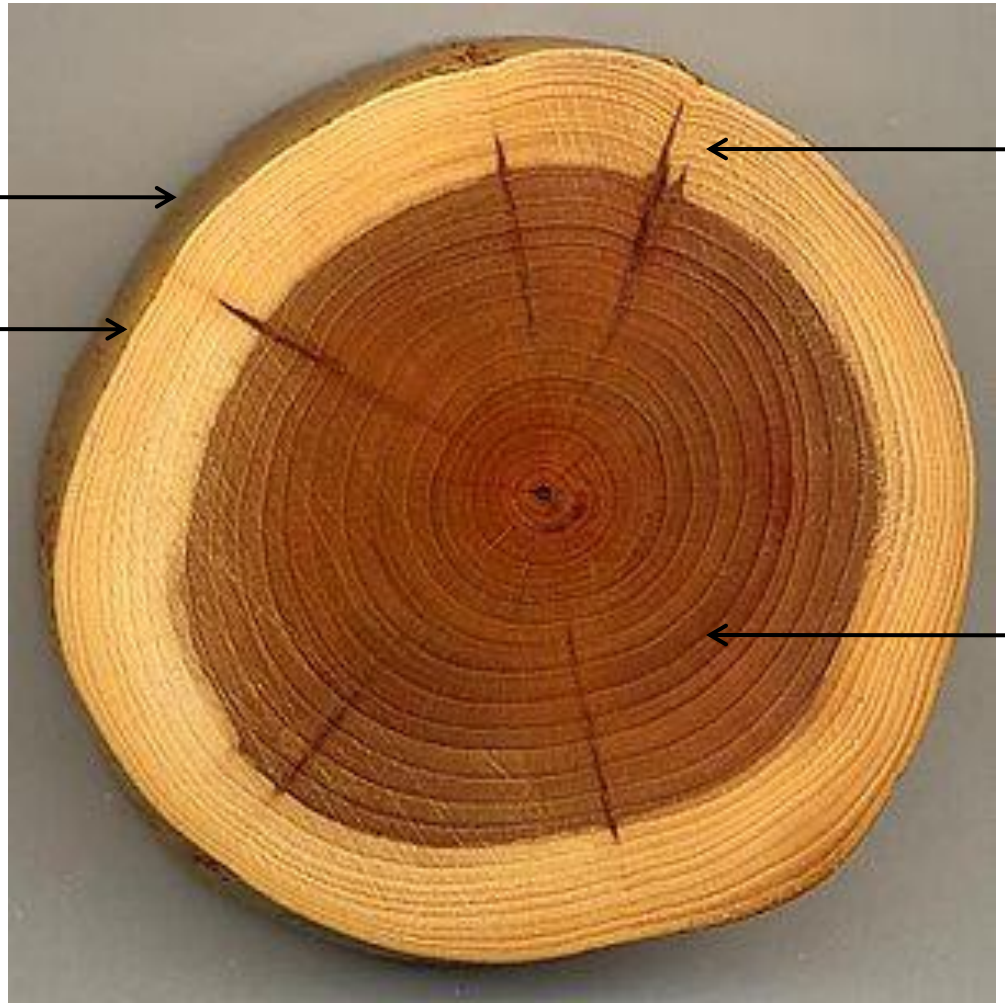
Wood Flooring Species

- Manufactured from hardwood trees
- Hardwood = trees that drop their leaves
- Harvested by cutting down tree, milling logs into lumber
- Each species has its own “personality”
- Many factors affect the way finished floor looks

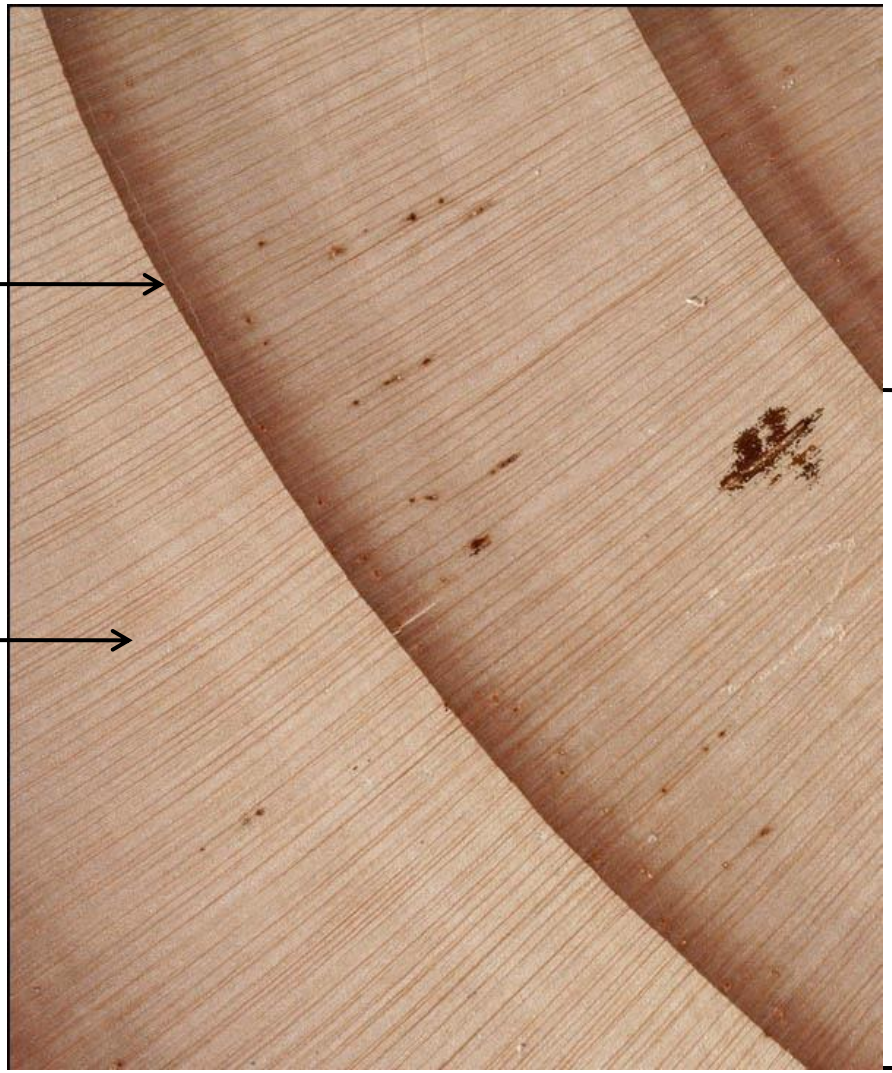
Hardwood Properties

- Heartwood vs. sapwood
- Annual growth rings
- Wood grain, texture

Hardwood Cross Section

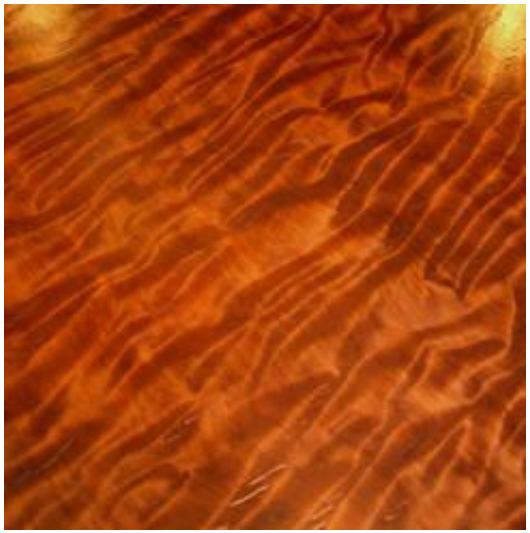


Hardwood Growth Rings



Hardwood Grain & Texture

Straight Grain



Spiral Grain

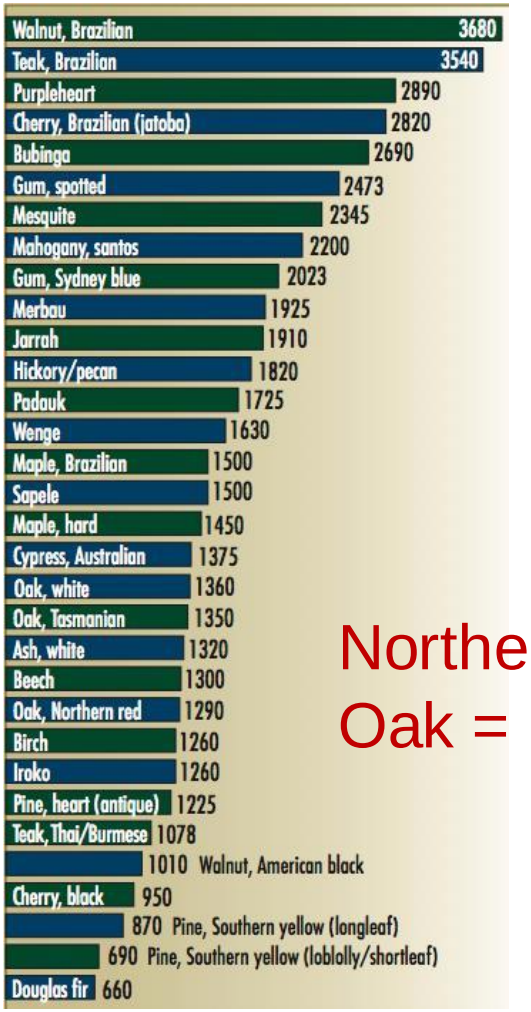
Curly Grain

Hardwood Hardness

- Each species has a different degree of hardness
- Domestic species less hard
  - Oak
  - Cherry
  - Walnut
- Exotic species more hard
  - Jatoba
  - Cumaru
  - Ipe
- Harder is not always better

Janka Ratings

- Force required to embed a .444-inch steel ball to half its diameter in a piece of solid wood
- Rates all solid wood species
- Northern red oak used as base value due to its prominence in the flooring industry



Northern Red Oak = 1290

Saw Cuts

Wood Flooring Cuts

- Plainsawn
- Quartersawn
- Riftsawn
- Livesawn

Style Changes

1970s

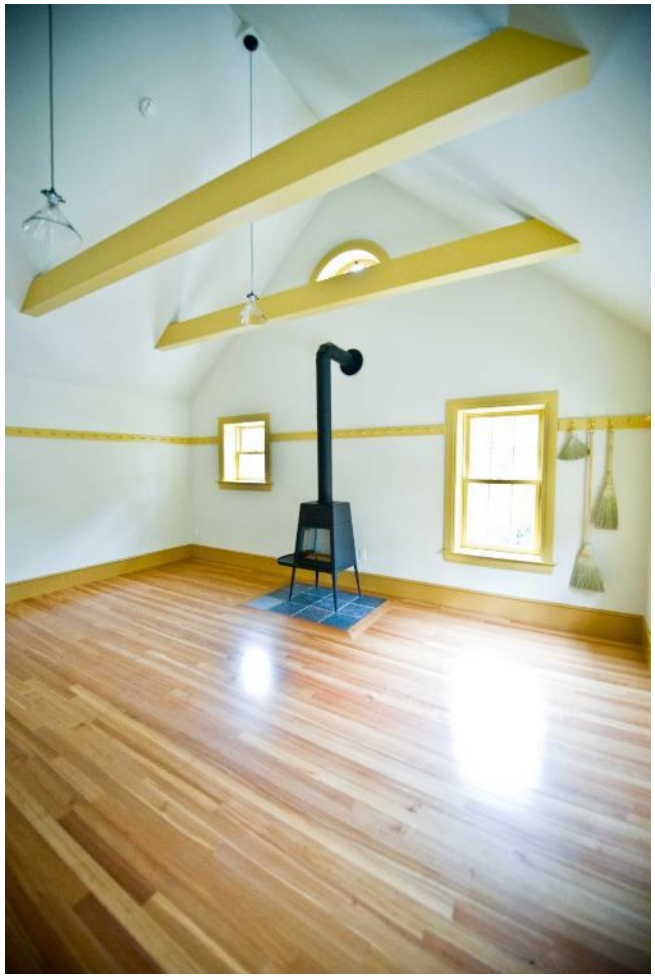
2010s

Style Changes

1970s

2010s

History of Cut



- Pre 1900s = quartersawn
  - Fashion
  - Function
  - Wasteful
- Today = plainsawn
  - More efficient
  - Less waste

History of Cut

- Rift, quartered
  - More efficient today
  - Minimal waste
  - Longer production
  - Adds to expense
- Cut dictates appearance

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 0-45º

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

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

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 45-90º 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 30-60º 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 30-60º to surface

Livesawn

- Combination of plainsawn, quartersawn, riftsawn

Livesawn

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

Livesawn

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

Performance

Plainsawn

- Expands, contracts through width
- Less dimensionally stable

Quartersawn

- Expands, contracts through thickness
- More dimensionally stable

Riftsawn

- Expands, contracts through thickness
- More dimensionally stable

Trends

Trends

- Wider boards
- Longer boards
- Random widths
- Character
- Rustic
- New hues

Wider Boards

- Plank: ≥ 3”
- Trend: ≥12”
- Respond more to moisture
- Longer acclimation
- Moisture testing, humidity controls critical to success
- General rule = wider plank requires more installation expertise

Random Widths

- Typically plank flooring
- Widths may include ranges from 3”-<12” on one floor
- Yields more lumber per log

Character

- Highlights more natural properties of each species
- Knots holes
- Mineral streaks
- Hand scraping
- Saw blade marks
- Stamps from previous use

Rustic

- Trend away from clear, uniform grain patterns
- Highlights natural properties of species
- Historically discarded as imperfect
- Sought out today for unique appearance

Color

- Brown no longer only choice
- Gray shades popular
- Black, white increasing

Advantages

Benefits of Wood

- Adds stability to structure
- Excellent insulation
- Durable
- Long-lasting
- Hypoallergenic
- Beautiful
- Timeless

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

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

Indoor Air Quality

- 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

Maintenance

Maintenance

- Most neglected aspect of specifying hardwood floors
- Essential component of the specification process
- Maximizes lifetime of product
- Minimizes inconvenience of costly renovation
- Protects client’s investment
- Promotes long-term sustainability of raw materials

Routine Maintenance

- Sweep, dust mop
- Vacuum with beater bar off to remove dirt, grit between floor boards
- Avoid water, steam mops which can damage finish, wood

Preventive Maintenance

- Place breathable throw-rugs at entrances
- Put felt pads on furniture in contact with floor
- Avoid walking on floor with sport cleats, high heels in disrepair

Preventive Maintenance

- Elephant = 50-100 PSI
- 125-pound woman in high heels = 2,000 PSI
- An exposed high heel nail head = 8,000 PSI

Preventive Maintenance

- Clean spills immediately with damp cloth
- Allowing liquids to sit damages finish, wood

Preventive Maintenance

- Clean pet stains immediately
- Urine stains floor when left untreated
- Repair often requires board replacement
- Damage may reach subfloor, requiring replacement

Preventive Maintenance

- Sunlight affects wood floors like skin
- Oxidation, UV exposure
- Periodically move furniture, rugs to minimize exposure

Preventive Maintenance

- Never use household dust cleaners on wood floors
- Use manufacturer recommended cleaner for floor’s
- If unsure, wood flooring professional can identify

Long-Term Maintenance

- Maintenance coat
  - Restores luster
  - Repairs small surface finish scratches
  - Lightly abrade surface finish
  - Apply new finish
  - Similar to repainting furniture
- Sand & refinish
  - Repair large scratches, dents
  - Repair exposed wood
  - Sand off finish, some wood
  - 1/32” wood removed
  - Apply new finish

Maintenance

- Restores beauty
- Will last decades
- Delivers enjoyment, value
- Extends service life

Summary

- Hardwood is an organic material with unique characteristics
- Prior to World War II, hardwood floors laborious to install
- Types of hardwood floors include solid, engineered
- Style include strip, plank, parquet
- Finished on the job site, at factory
- Each hardwood species has unique properties
- The Janka Scale measures hardness of solid wood species
- Hardwood lumber is plainsawn, quartersawn, riftsawn, livesawn
- Current design trends include wider boards, random widths, character marks, rustic species , color variety
- Benefits include structural integrity, sustainability, environmental friendliness, improved indoor air quality
- Routine care requires sweeping, vacuuming with beater bar off
- Long-term care requires a maintenance coat, sanding, refinishing

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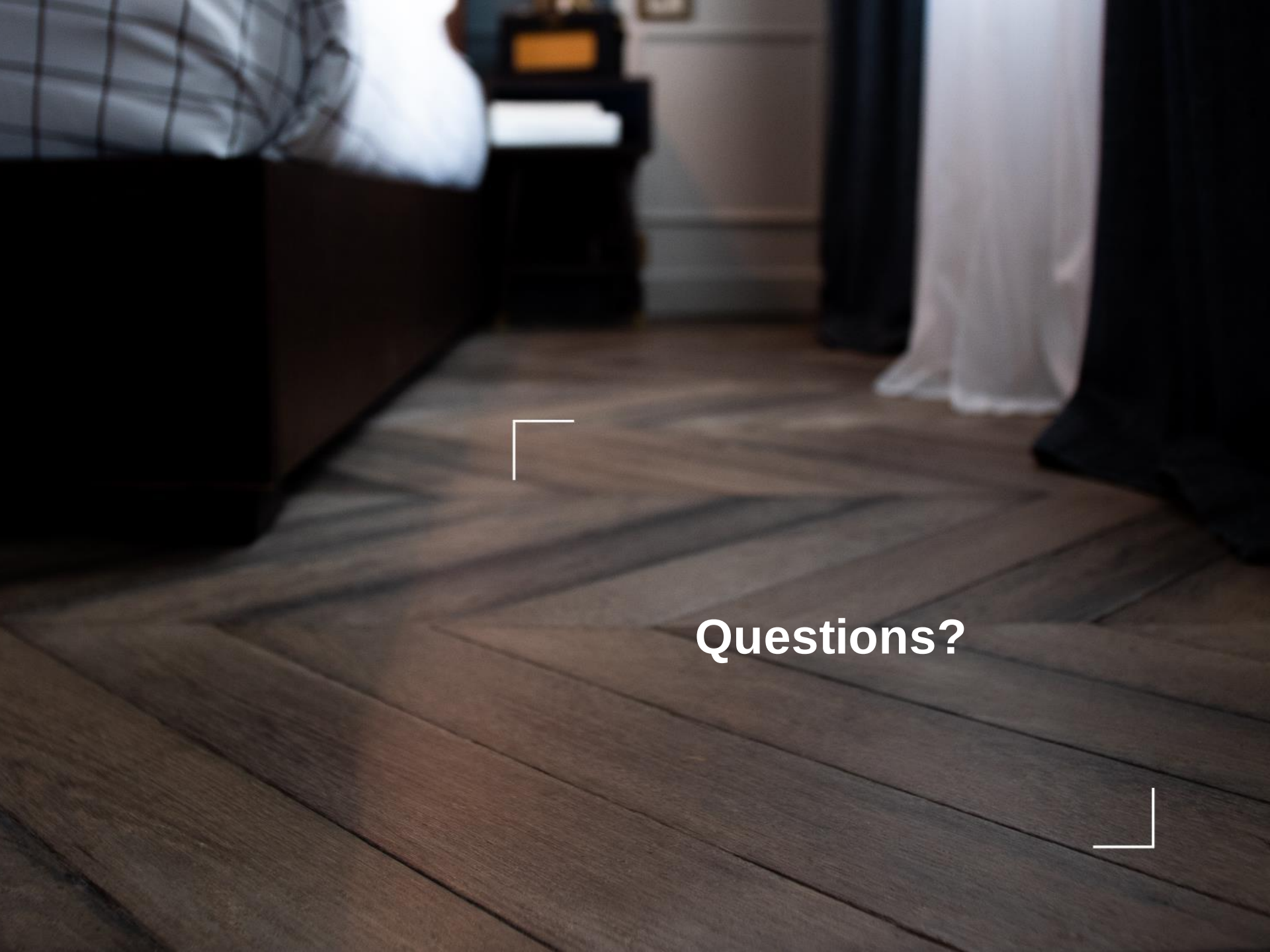
Questions?