SLICED WOOD VENEER + FIRE COMPLIANCE + SUSTAINABILITY

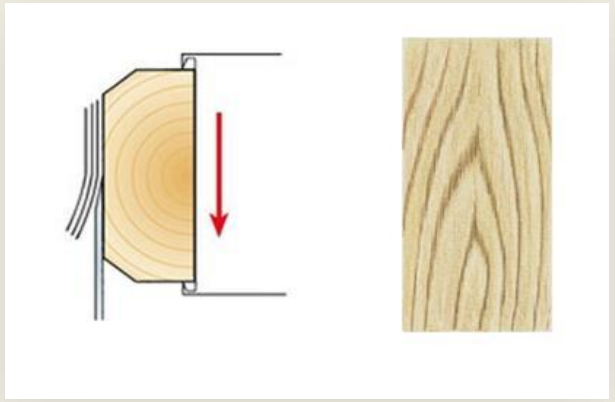
Learning outcomes

- Gain an understanding of the fundamental properties, attributes, fabrication methods, applications and types of timber veneer
- The basics of how to specify timber veneer
- NCC requirements in Table 3 – Section 4 – Specification C1.10
- Fire Hazard Group Numbers and wood veneers
- Sustainable forest management in Australia and overseas
- Environmental benefits of sustainable timber and veneer
- Independent forest certification and how Chain of Custody works

ABOUT SLICED WOOD VENEER

- Wood sliced very thin (0.6mm) on a machine called a slicer.
- Comes as narrow leaves (in a bundle or “flitch”).
- Leaf width varies because logs are round and different sizes.
- These leaves get joined together to make sheets (“layons”).
- Then glued onto a wood based panel substrate (eg MDF).
- Then the panel is sanded and trimmed to size:
  3000mmx1200mm *Note: Australian species often not avail in 3000mm*
  2700mmx1200mm
  2400mmx1200mm
- Edge-banded then fabricated to joinery, furniture or wall panels
- Then clear coated *(or sometimes a coloured stain applied before or within the clear coating)*
- Real wood veneer is a natural product and will vary from log to log and within a log, may also have natural features such as small knots

TECHNICAL – THE BASICS of WHAT to SPECIFY



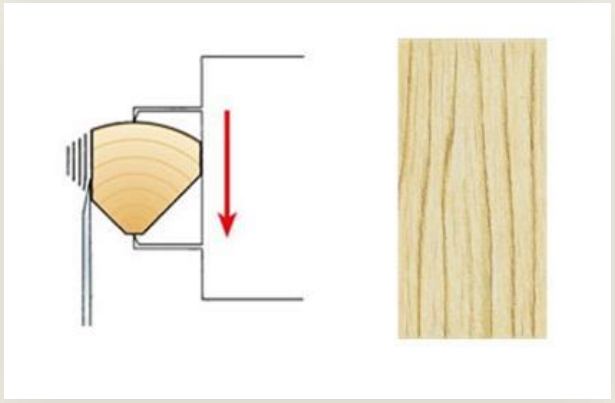
1 **Veneer species or name**

2 **Supplier**

3 **Cut**

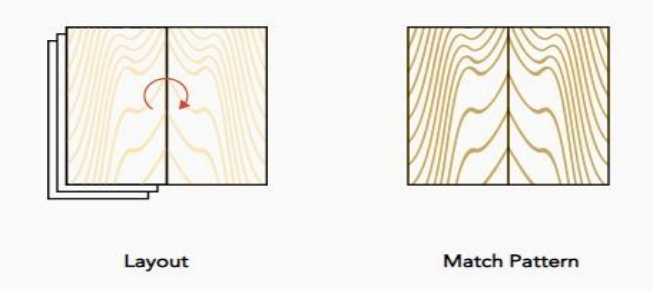
- **Crown-cut** (produced by slicing across the log making a “V” shaped grain)

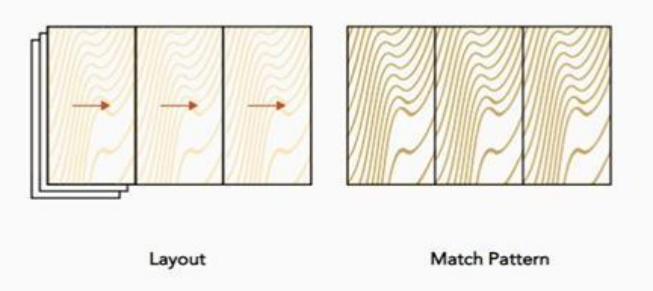
or

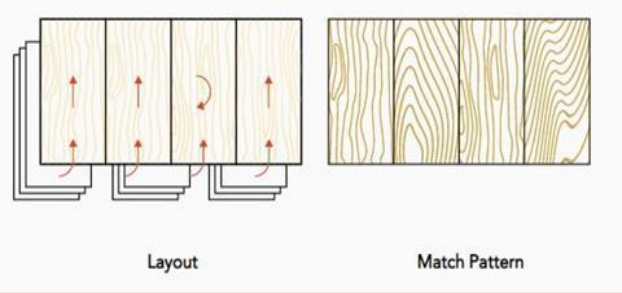


- **Quarter-cut** (slicing into the centre of the log, making a linear grain)

TECHNICAL – THE BASICS of WHAT to SPECIFY







4 Veneer leaves can then be joined (matched) in different ways:

- **Book Matching** = Consecutive veneer leaves are flipped over facing each other like pages in a book. Most commonly used for Crown-cut veneer. Traditional. Good for cabinetry & small areas of wall paneling.

- **Slip Matching** = Consecutive veneer leaves joined side to side, creating a repeating grain pattern across the panel. Is a good matching method for Quarter-cut veneer. Good for cabinetry & small areas of wall paneling

- **Random Matching** – The leaves are placed in a random order and orientation, giving an appearance of solid timber planks. This method is good for large areas of walls and ceilings, because it gives a consistency across hundreds of panels.

American White Oak
Crown-cut
Book-matched
Origin: USA
Sustainable
Available as FSC certified

Victorian Ash
Quarter-cut
Slip-matched
Origin: Australia
Sustainable
PEFC certified

Spotted Gum
Quarter-cut
Random-matched
Origin: Australia
Sustainable
PEFC certified

COST: Plain raw veneer sheets can range from $10/m2 (for say Hoop Pine) to $120/m2 for expensive dyed veneers and up to $250/m2 for Burls. Add on about $150 for pressing on to substrate and finishing, burls may cost extra.

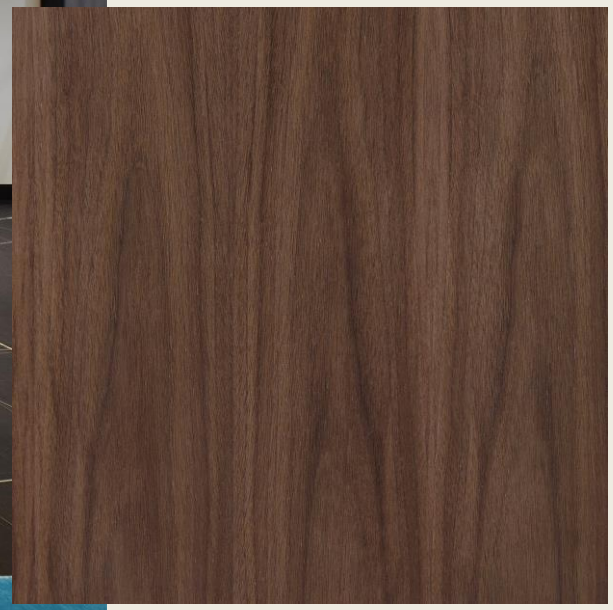
LEAD TIMES: Most veneers are in stock (refer to suppliers' websites). Add on about 10 working days to get veneers pressed onto substrate. Then add on the time for the joiner, cabinet maker etc to fabricate and finish joinery, wall panels etc.

SUITABLE APPLICATIONS, DURABILITY and CARE:

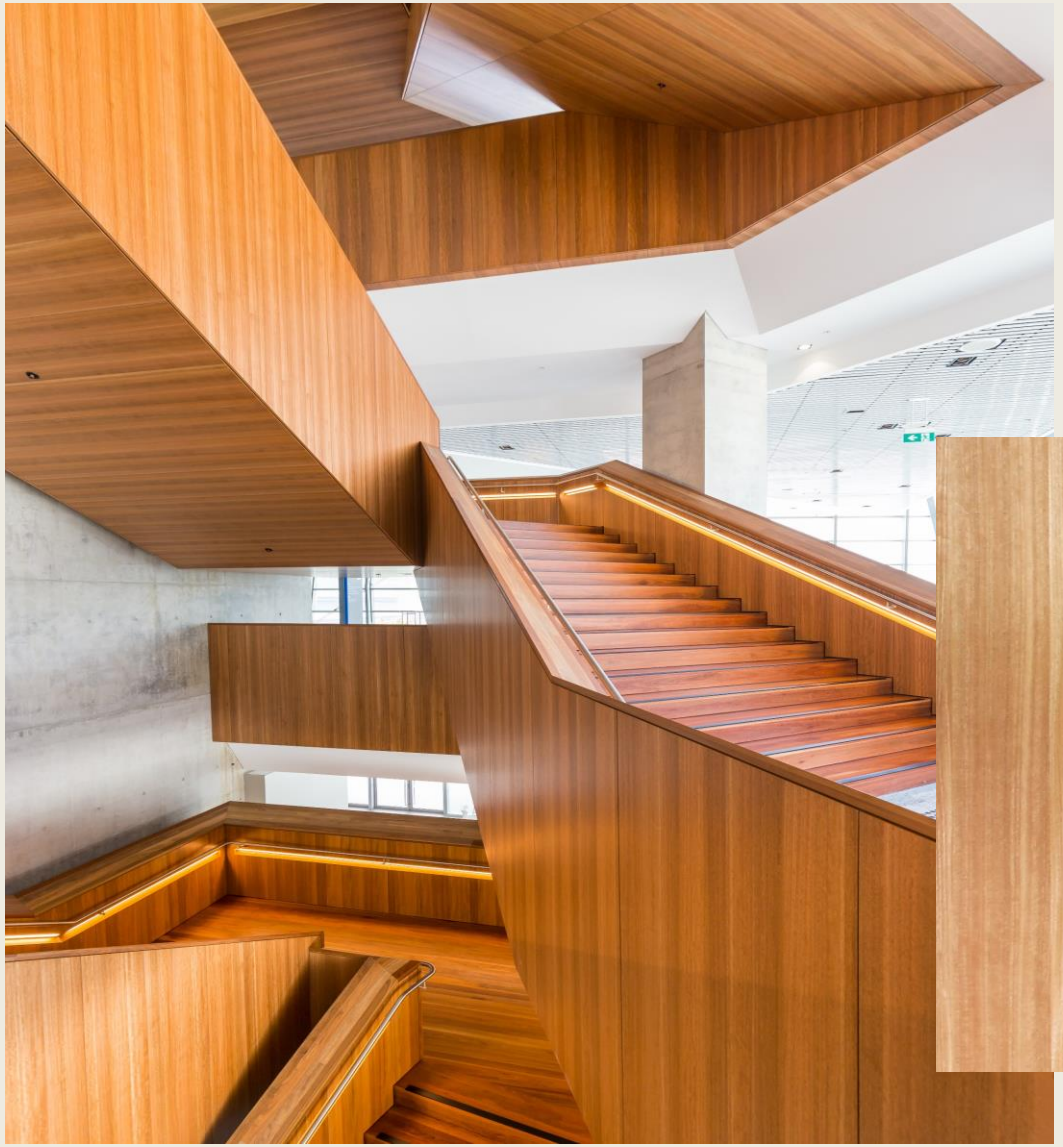
- Interior, dry, low wear applications only
- Not suited to floors, kitchen/bathroom counter tops, splash-backs or steamy areas
- Not suited to areas subject to ongoing condensation
- Do not use above stoves and dishwashers or on medium/high wear horizontal surfaces
- May be used for bathroom vanity doors if the room is kept dry and properly ventilated
- Veneer should not be used in exterior applications even if under an awning.
- Avoid applications in direct sunlight or long periods of intense light as the veneer may craze, crack and discolour. This is especially the case with dyed and reconstituted veneers
- Clean using a soft damp rag and mild detergent only
- Do not use furniture wipes, harsh cleaners, chemicals, bleach, ammonia, solvents, alcohol, products containing orange oil, abrasive cleaners or silicone based products.

APPLICATIONS: Must be INTERIOR – DRY – LOW WEAR – PREFERABLY VERTICAL

Cabinetry
American Walnut
Crown-cut
Book-matched
Origin: USA
Sustainable
Available as FSC certified



VARIABILITY IN APPEARANCE



Stair balustrade

Spotted Gum

Quarter-cut

Random-matched

Showing the high degree of variability that is very common in Australian species Random matching of leaves is a good way to "blend"/"merge" variability.

Origin: Australia

Sustainable

PEFC certified

RECONSTITUTED VENEERS – very consistent

Kitchen

TrueGrain Luca

Reconstituted dyed wood veneer

Origin: China

Sustainable

FSC certified

DYED VENEERS – colours that are not possible with natural veneer

Kitchen cabinet doors

Woodstock Grey Birch

Dyed real wood veneer

Origin: Italy

Sustainable

FSC certified

SOME VENEER SPECIAL TYPES/FEATURES

FIRE RATINGS and THE NATIONAL CONSTRUCTION CODE

- Veneered and other wood panels used for internal walls, ceilings and lift cars in Class 2 to Class 9 buildings need to meet the **Fire Hazard Group Numbers** and Smoke Growth Rate Index/Average Specific Extinction area as specified in the National Construction Code (NCC) 2019 - Specification C1.10 - Section 4 - Table 3 "Wall and Ceiling Linings" (see next page)

- Group 1 products have the best fire performance, Group 4 the worst. But note that products with a lower Group Number are usually more expensive than those with a Higher Group Number.

- The Fire Hazard Group Number of a product is determined using AS 5637 - ISO 9705 full Room Burn Test

- Veneers and laminates must be tested on substrate

- *Non-combustible* means that something won't burn, fire *retardant* means that it will slow down a fire but will not stop it

- Fire ratings required for doors and other parts of buildings are not covered by Specification C1.10 – these come under a different section of the National Construction Code.

- Under the NCC, loose joinery and furniture does not have to be fire rated

Please note that the Fire Rating and NCC information in this presentation is for general educational purposes only and does not constitute advice, legal or otherwise. To ensure fire compliance of your project/design please seek the advice of a suitably qualified and certified Fire Engineer and/or Building certifier.

National Construction Code (NCC) 2019 - Specification C1.10 - Section 4

4. Wall and ceiling linings

(a) A wall or ceiling lining system must comply with the *group number* specified in Table 3 and for buildings not fitted with a sprinkler system (other than a FPM 101D or FPM 101H system) complying with Specification E1.5 have-

(i) a *smoke growth rate index* not more than 100; or

(ii) an *average specific extinction area* less than 250 m^2/kg.

(b) A *group number* of a wall or ceiling lining and the *smoke growth rate index* or *average specific extinction area* must be determined in accordance with AS 5637.1.

Table 3 Wall and ceiling lining materials (material groups permitted)

Class of building	Fire-isolated *exits* and fire control rooms	Public corri-dors	Specific areas	Other areas
Class 2 or 3, Unsprinklered Excluding accommodation for the aged, people with disabilities, and children	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 2 or 3, Sprinklered Excluding accommodation for the aged, people with disabilities, and children	Walls: 1 Ceilings: 1	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 3 or 9a, Unsprinklered Accommodation for the aged, people with a disability, children and *health-care buildings*	Walls: 1 Ceilings: 1	Walls: **1** Ceilings: 1	Walls: **1, 2** Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 3 or 9a, Sprinklered Accommodation for the aged, people with a disability, children and *health-care buildings*	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 5, 6, 7, 8 or 9b schools, Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2,

				3
Class 5, 6, 7, 8 or 9b *schools*, Sprinklered	Walls: 1 Ceilings: 1	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1 ,2, 3
Class 9b other than *schools*, Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 9b other than *schools*, Sprinklered	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3
Class 9c, Sprinklered	Walls: 1 Ceilings: 1	Walls: 1, 2 Ceilings: 1, 2	Walls: 1, 2, 3 Ceilings: 1, 2, 3	Walls: 1, 2, 3 Ceilings: 1, 2, 3

Notes to Table 3:

1. "Sprinklered" means a building fitted with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5.
2. **"Specific areas" means within-**
   a. for Class 2 and 3 buildings, a *sole-occupancy unit;* and
   b. for Class 5 buildings, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5; and
   c. for Class 6 buildings, shops or other building with a minimum floor dimension/floor to ceiling height ratio> 5; and
   d. for Class 9a *health-care buildings*, *patient care areas*; and
   e. for Class 9b theatres and halls, etc, an auditorium; and
   f. for Class 9b *schools*, a classroom; and
   g. for Class 9c buildings, *resident use area*.

5. Air-handling ductwork

Rigid and flexible ductwork in a Class 2 to 9 building must comply with the *fire hazard properties* set out in AS 4254.1 and AS 4254.2.

6. Lift cars

Materials used as-

(a) floor linings and floor coverings must have a *critical radiant flux* not less than 2.2; and

(b) wall and ceiling linings must be a Group 1 material or a Group 2 material in accordance with AS 5637.1.

LIFT CAR INTERIORS

The walls and ceilings of lifts must be Group 2 or Group 1.
Refer to NCC 2019 - Specification C1.10 - Section 6.

THE FIRE HAZARD GROUP NUMBERS of WOOD VENEER

The Fire Hazard Group Number of a veneer is governed by the Species and the Substrate type & thickness

Fire Hazard Group 3 - All veneers (except Teak) on 6mm+ standard MDF & Particleboard reach Fire Hazard Group 3. See Timber Industry Assessment Report

Fire Hazard Group 2 - All veneers of density up to 755kg/m3 on Briggs Flameblock Fire Retardant MDF (FRMDF) 12mm and thicker achieve Group 2.

There are around 100 veneers that meet this criterion, listed in Briggs Group 2 Assessment Report, including American White Oak, American Walnut, Hoop Pine and Tasmanian Oak

BUT high density Australian eucalypt veneers such as Blackbutt, Spotted Gum, Ironbark and Jarrah do not reach Group 2, they burn too hot and overpower the FRMDF.

Fire Hazard Group 1 - As far as we know, it is near impossible for wood veneer on a wood based substrate, even if fire retardant, to achieve Group 1. Group 1 products need to be near to non-combustible

BUT Some proprietary wall and ceiling systems may reach Group 1 due to their special design and/or the use of non-wood-based substrates such as metal or mineral type substrates.

Hoop Pine Veneer on **Briggs Flameblock FRMDF**

Fire Hazard Group 2

SUSTAINABILITY and INDEPENDENT CERTIFICATION of FORESTS

- According to the Oxford dictionary, sustainability is the *"avoidance of the depletion of natural resources in order to maintain an ecological balance"*.

- Sustainable harvest means that the amount of timber that grows back or is re-planted each year is greater than, or equal to, the amount harvested

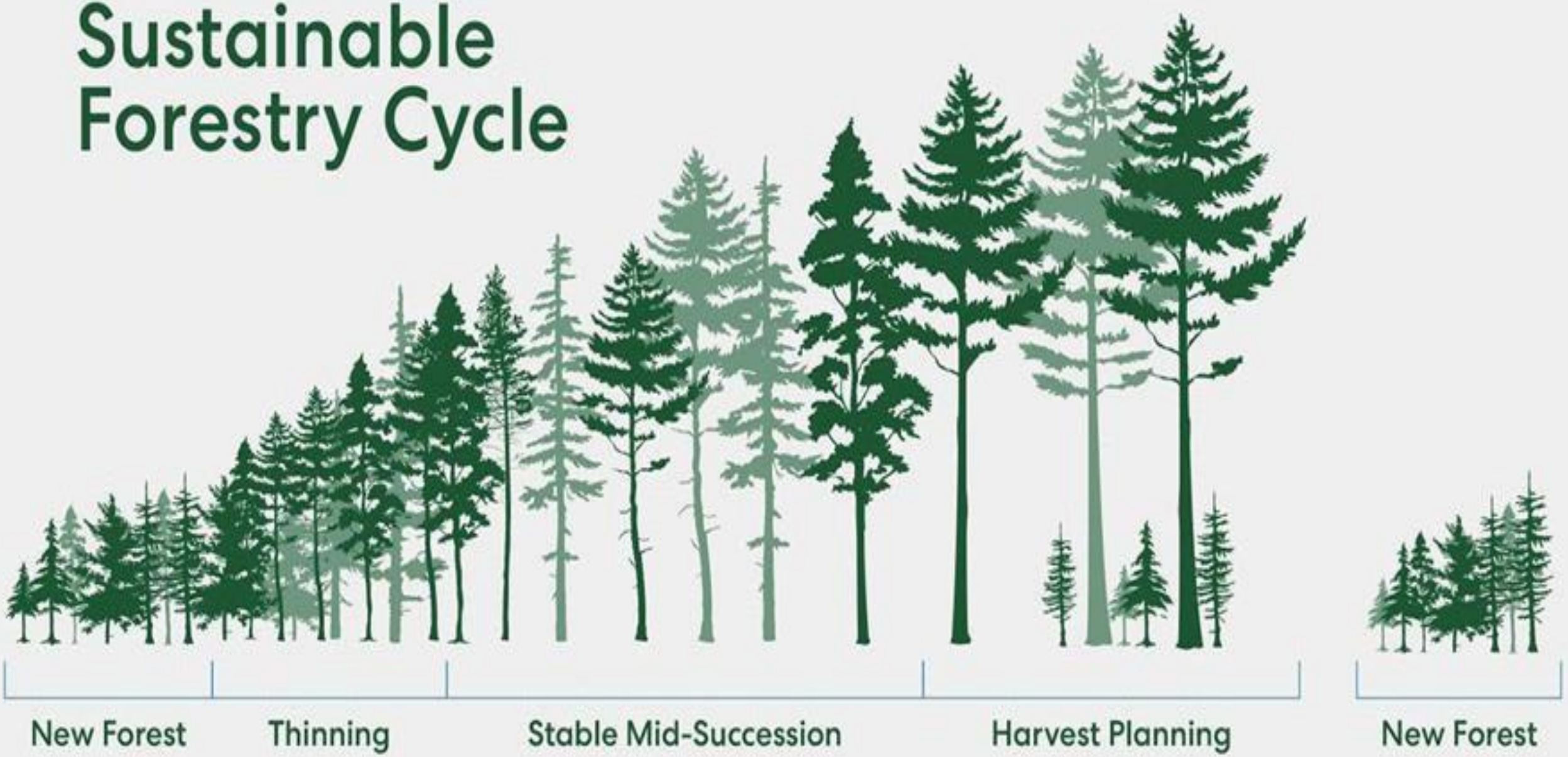
- Plus environmental values such as biodiversity, threatened species, habitat trees, water quality and soil quality are preserved.

- Sustainable forests are harvested in different ways depending on factors such as the particular ecosystem and forest type, climate, and natural fire cycle.

- Forests in the USA, New Zealand, Australia, Canada and EU are sustainably managed.

- Independent forest and wood certification such as by PEFC® and FSC® take certification a step further by ensuring that the forest is being sustainably and responsibly managed and harvested, that environmental standards are met and that the supply chain from forest to market is secure.

Sustainable Forestry Cycle



SUSTAINABLE FOREST MANAGEMENT in AUSTRALIA

- All government owned forests in Australia are sustainably harvested under strict environmental codes.
- Privately owned forests such as farm woodlots are also governed by very strict environmental laws.
- Additionally, more than 76% of Australia's old growth forests and 35% of our forests are permanently protected from harvest, designated as National Parks, forest and conservation reserves and World Heritage Areas.
- Sustainable forests are harvested in different ways depending on factors such as ecosystem and forest type, climate, and natural fire cycle.
- For instance in the Mountain/Tasmanian Ash forests of Australia, seed release is triggered by fire. And seedlings grow best in the fertile soil created by the ash from fires, in strong sunlight, free from any understory or competing plants.
- For good regeneration, these forests are often harvested by clear-felling and burning, mimicking the regeneration of the forest after bush-fires.

Tasmanian Oak & Stringybark - 17 years of regeneration

https://www.youtube.com/watch?v=2UMk23xKybA

SUSTAINABLE FOREST MANAGEMENT in EUROPE and NORTH AMERICA

- The cool temperate coniferous and deciduous forests of Europe and North America (think….White Oak, European Oak, American Walnut, Western Red Cedar) are very different from Australian forests (drought and fire resistant Eucalypts).
- Natural regeneration in such cool temperate forests is via individual trees dying of old age and young seedlings replacing them.
- These trees are not adapted to fire and the seedlings can grow and flourish in somewhat shaded positions (unlike Eucalypts many of which thrive after fire and which require a lot of sunlight).
- The best way to manage these forests is to selectively harvest the older trees, opening a small space for a young seedling to grow, mimicking the natural cycle of individual tree life and death.
- The following video shows harvested logs in a Swiss World Heritage Area. Such regions have been sustainably and legally harvested for thousands of years.

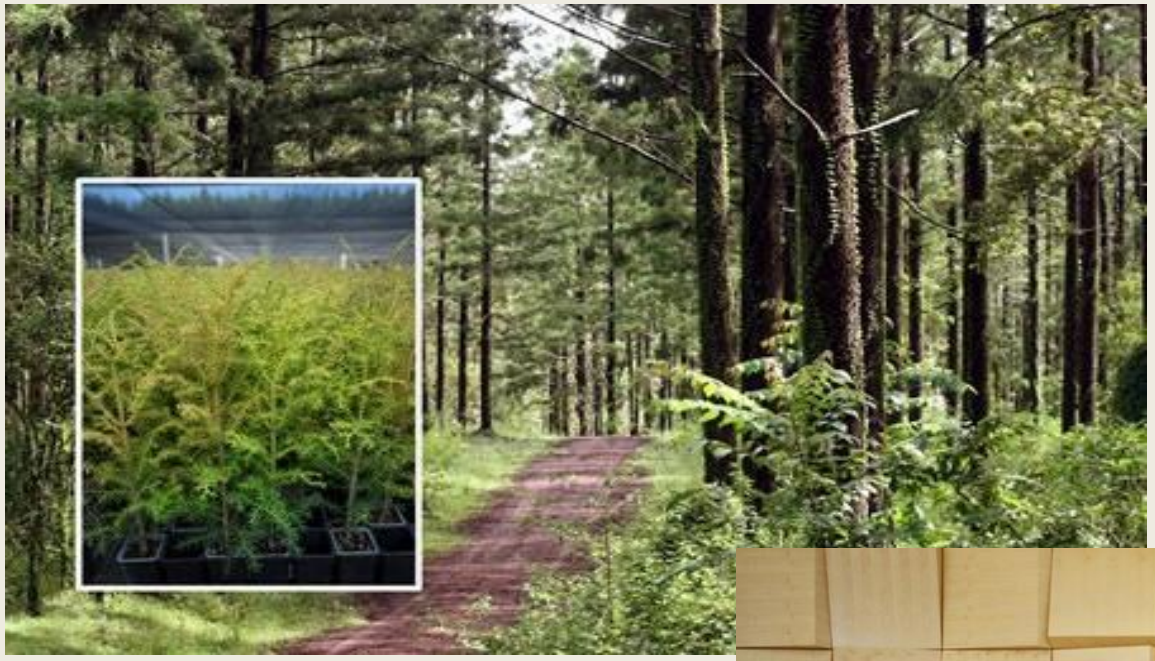
Swiss Forest with logs

https://www.youtube.com/watch?v=y4TUhkjvISk

ENVIRONMENTAL BENEFITS of SUSTAINABLE TIMBER

- Carbon storage - as trees grow, they take carbon out of the atmosphere which remains "stored" in the tree and its products for life
- Renewable - in responsibly managed forests and plantations, the harvested trees are replaced with new trees, either planted by hand or naturally seeded
- Land use and biodiversity - responsibly managed native forests are a natural ecosystem and consequently have high biodiversity
- Environmentally efficient - one cubic metre of wood can cover more than 1,000m2 of panel surface

FSC and PEFC FOREST CERTIFICATION



Nursery seedlings and plantation - PEFC certified Hoop Pine Forest

Certification is the process by which an independent third party such as PEFC® and FSC® ensure that the forest is being sustainably and responsibly managed and harvested, and that environmental standards are met.

PEFC® Hoop Pine feature wall

CHAIN of CUSTODY CERTIFICATION

- FSC® and PEFC® Chain of Custody certification is a system that ensures the sustainable origin of timber via careful inventory control and audit at every stage in the supply chain
- Each company from forest to market is independently audited and certified to ensure the link in the chain of custody/ supply of certified timber is not broken
- Few if any other products have such a secure environmental supply chain system

AVAILABILITY, PRICE, APPEARANCE OF CERTIFIED TIMBER and VENEER

- All Australia's government owned forests are PEFC® and/or FSC® certified.
- Many small private forests and farm woodlots are not however, because the documentation and "paperwork" to be done by the forest owner is expensive and time consuming, making these schemes unfeasible for some small farmers and growers.
- Certified and uncertified wood of the same species cannot be differentiated by appearance.
- Certified wood is sometimes more expensive than uncertified sustainable wood, because of the record keeping costs mentioned above, and audit/certification charges.

Thank you

Quiz questions

1. Should you specify veneer for:

- An outdoor BBQ area
- A wardrobe
- A boardroom table
- Wall lining around an indoor swimming pool

2. What are the 4 essential things to specify for timber veneer in a project

3. Will a Fire Assessment Report for a flat unmodified panel automatically apply to the panel if it is slotted and/or curved?

4. Which panel would have the greater resistance to fire: Group 3 or Group 2?

5. Name the two forest certification schemes

6. Briefly explain how Chain of Custody works