

Surface treatment of wood in hospital buildings

Nordic seminar on the health effects of wood

November 28, 2018
Christiania Quartalet Meeting Center, Oslo

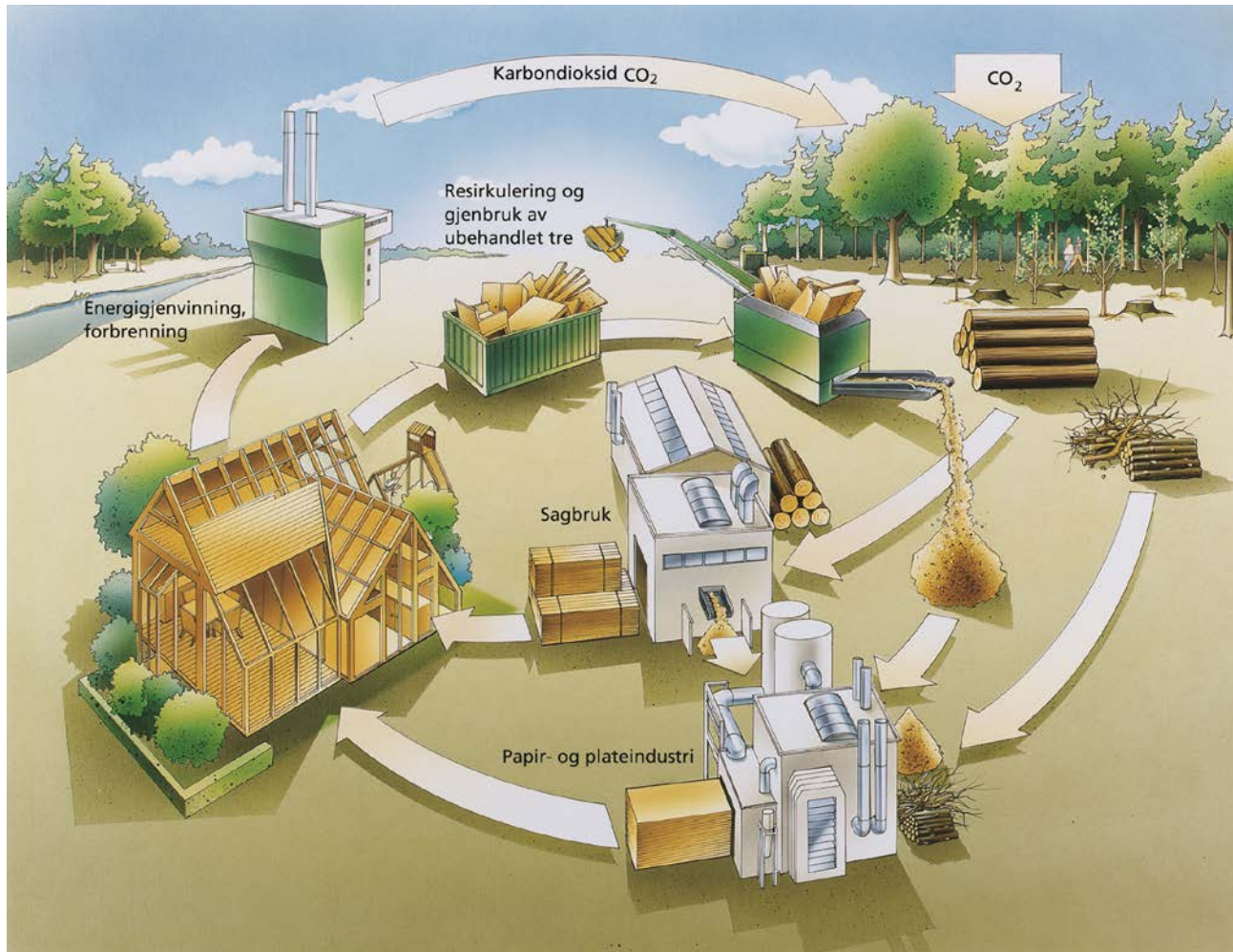
Ulrich Hundhausen



**WE
WANT
WOOD**



Environmental aspects?





Solid



VENEER



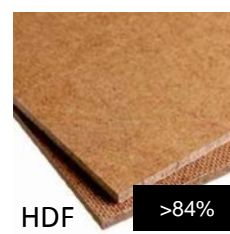
CHIP



FIBER



COMPOSITE



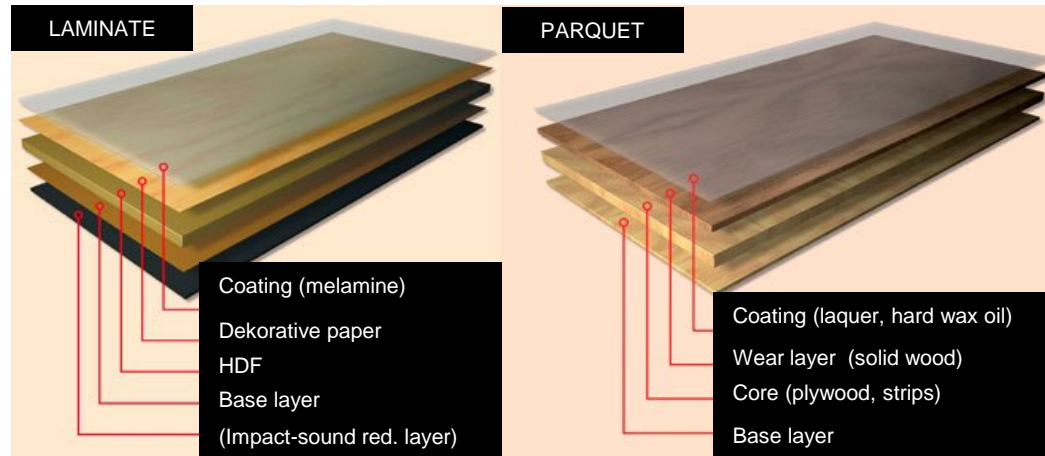


**WE
WANT
WOOD**



But why?

Esthetics (psychological effects)?



MDF



Solid wood

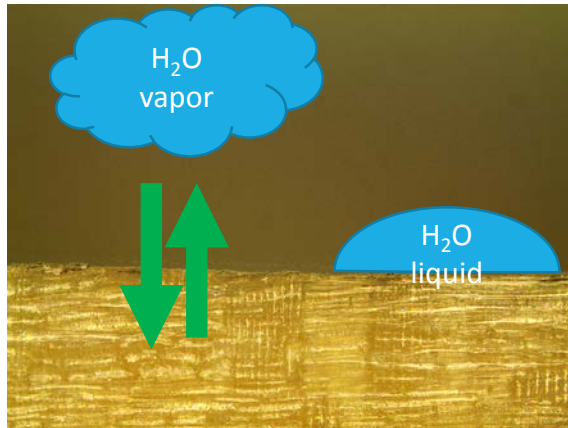


**WE
WANT
WOOD**

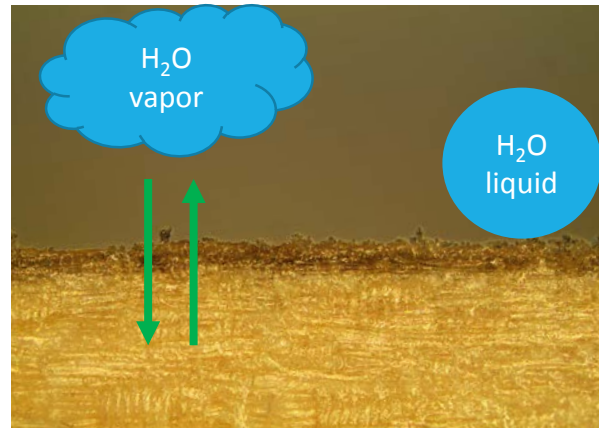


Indoor air quality?

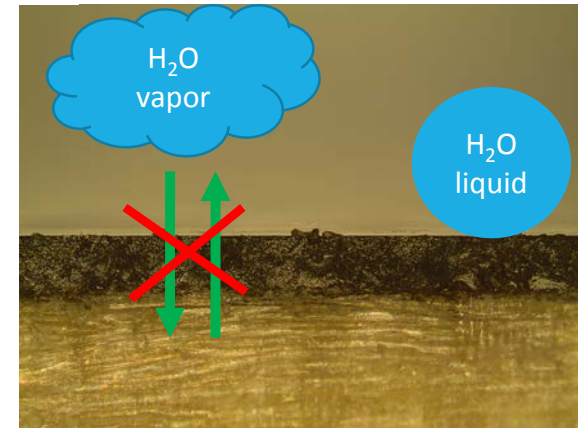
No coating



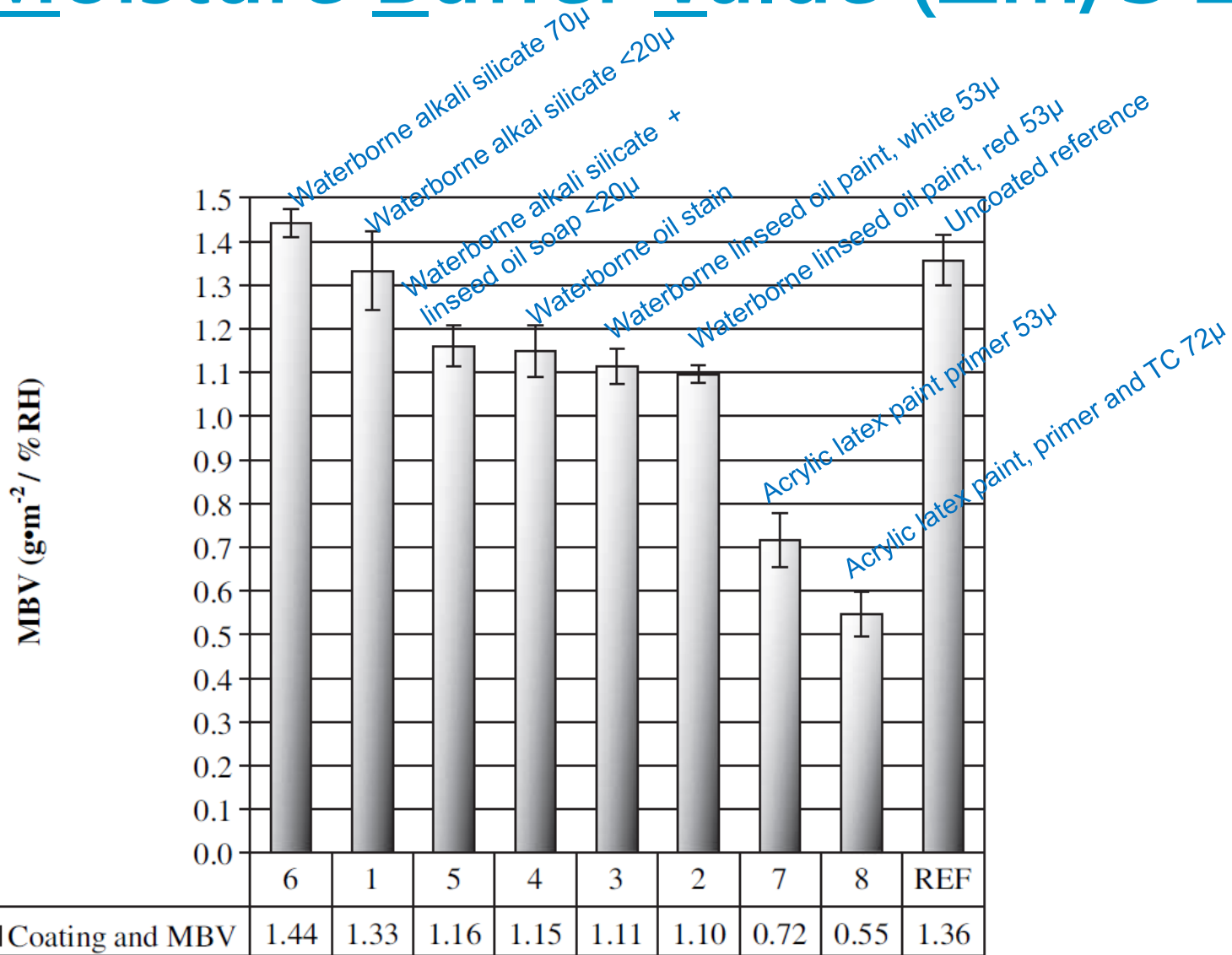
Non film-forming coating



Film-forming coating

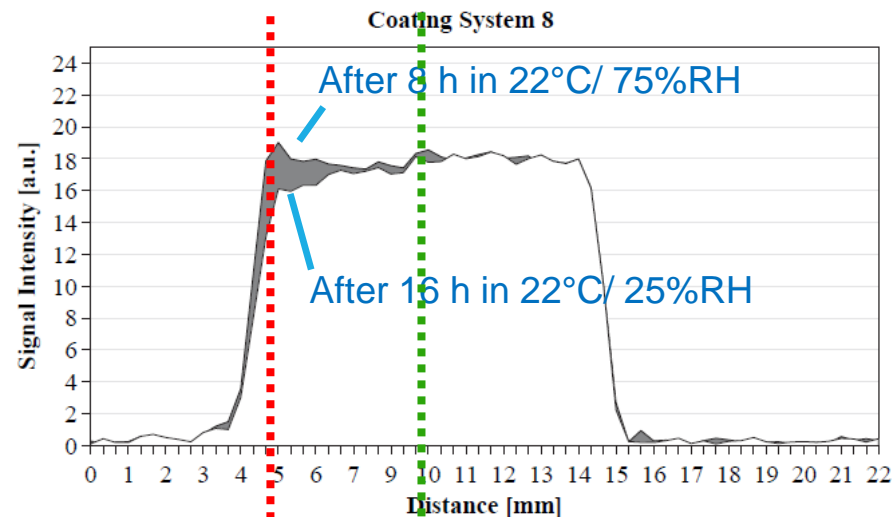
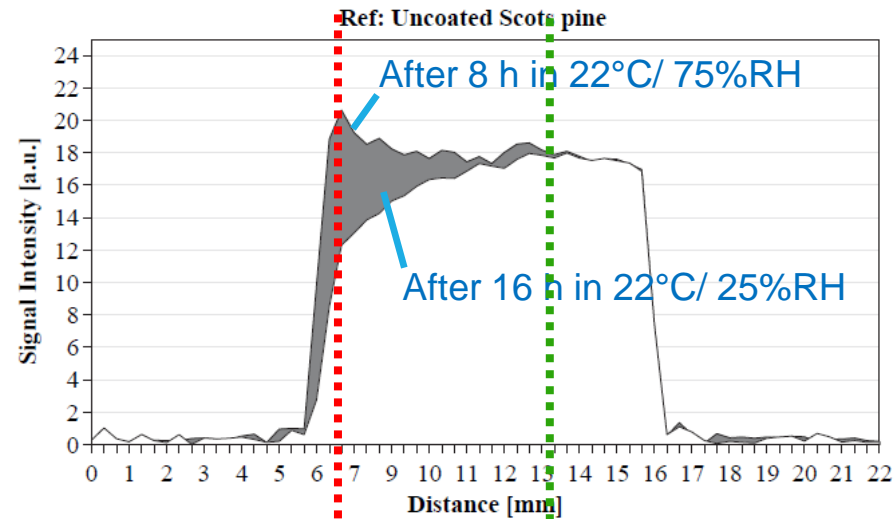


Moisture Buffer Value ($\Delta m/S \Delta RH$)



Hameury S et al. (2007): Influence of coating system on the moisture buffering capacity of panels of *Pinus sylvestris* L., *Wood Mater Sci Eng* (2:3-4), 97-105

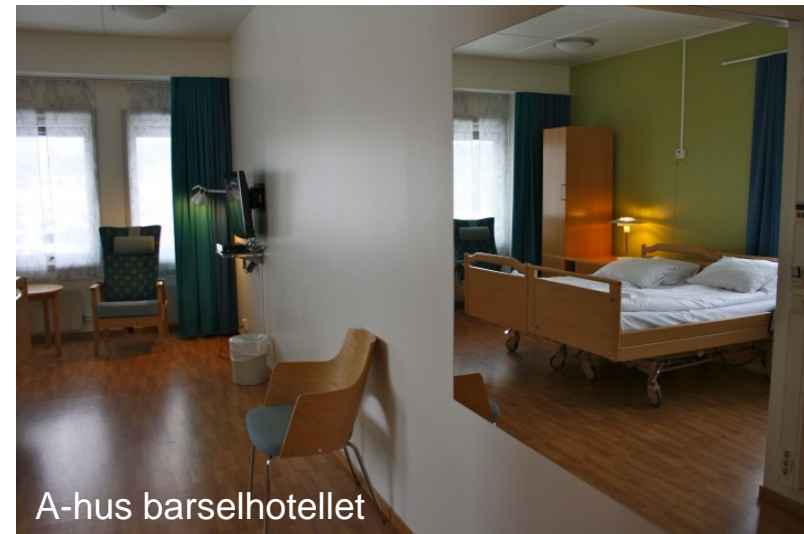
Moisture buffer value



Hameury S et al. (2007): Influence of coating system on the moisture buffering capacity of panels of *Pinus sylvestris* L., *Wood Mater Sci Eng* (2:3-4), 97-105

Requirements in health buildings

- Most areas are highly frequented

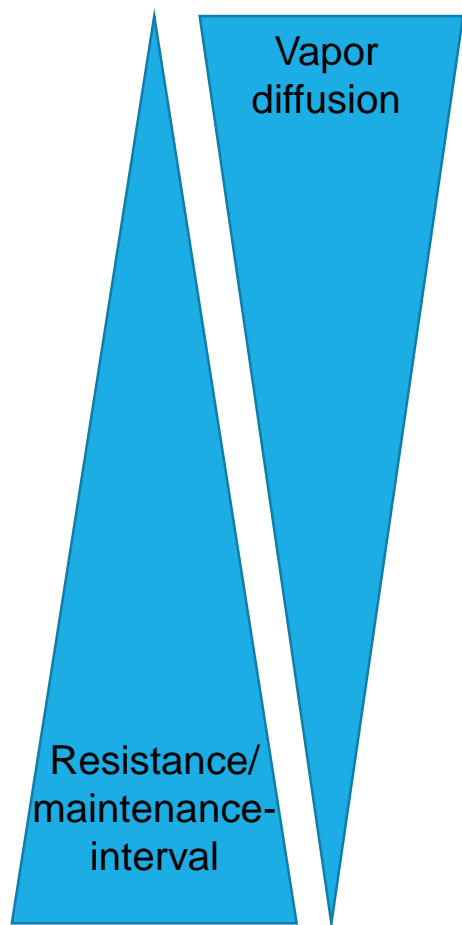


Recommended properties of floors related to their application field in hospitals

	<i>Abrasion</i>	<i>Indentation resistance</i>	<i>Chemical resistance</i>	<i>Walking comfort</i>	<i>Warm comfort</i>	<i>Slippery resistance</i>	<i>Chair castor resistance</i>	<i>Water tightness</i>	<i>Water resistance</i>	<i>Staining resistance</i>	<i>Cleanability</i>	<i>Repairability</i>
Bath room	4	4	G5		1-4	4	5	5	5	5	5	
Desinfection room	4	4	H5		1-3	4	5		5	5	5	
Laboratory	4	4			1-3	5	5		5	5	5	
Ward	4	4		4	4	4	5				5	3
Corridor	4	4		4			5				4-5	
Operating room	4	4					5				5	

Nivå	Byggdetaljer 541.002 and EN 685
5	Must have best properties
4	Must have good properties
3	Must have normal properties
2	Must fulfil low requirements
1	Limited suitability

Wet coatings



Lime, chalk and soap

Oil,
oil/wax,
hard wax oil

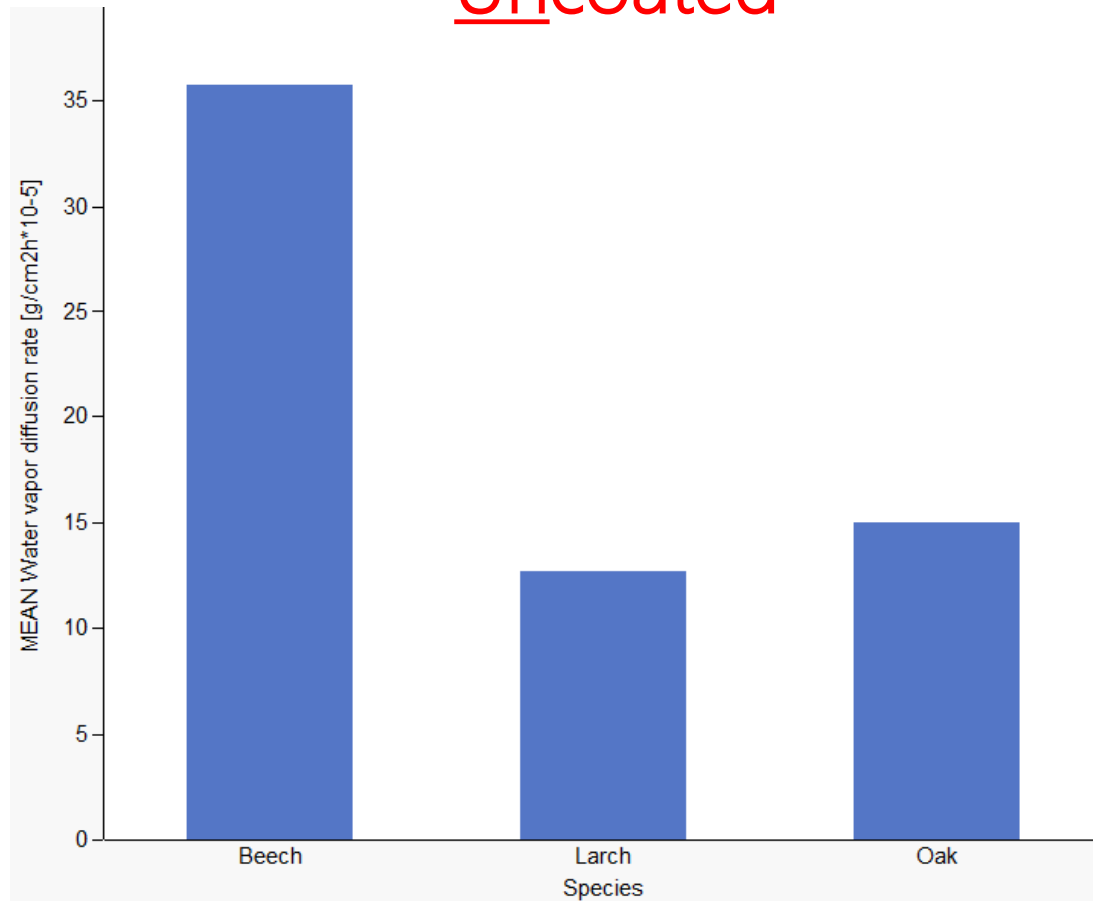
Lacquer and paint



Water vapour diffusion Multi-layer parquet



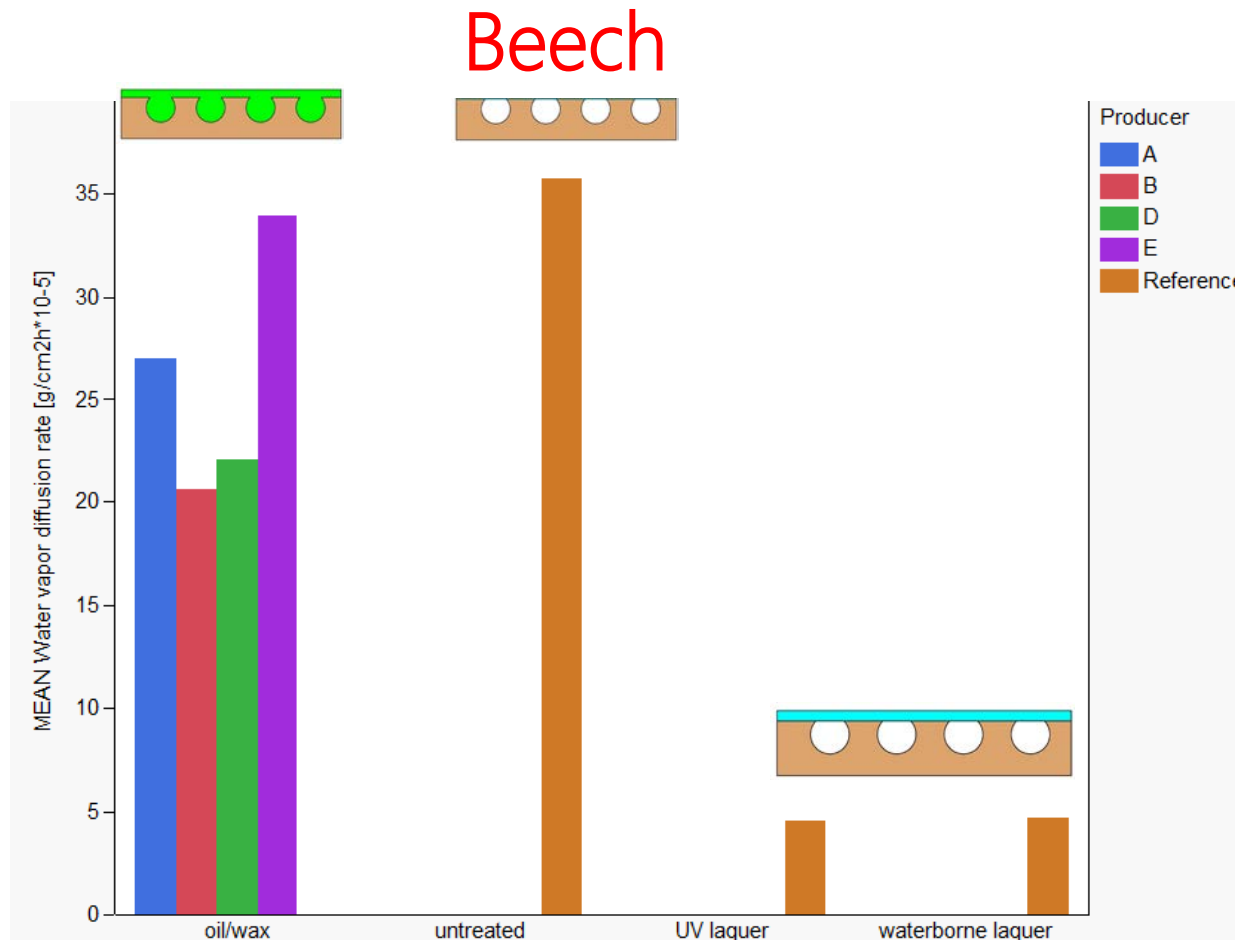
Uncoated



Grüll G et al. (2012): Diffusion properties of oil/wax systems on industrially finished wood floorings, *Holztechnologie* (53), 31-34

Water vapour diffusion

Multi-layer parquet



Grüll G et al. (2012): Diffusion properties of oil/wax systems on industrially finished wood floorings, *Holztechnologie* (53), 31-34

Lacquer vs. hardwax oil

Property	Lacquer	Hardwax oil
Resistance	Very high	Moderate
Appearance	Very reflective	More natural
Cracking/bursting	Possible	Not possible
Reparability	Whole floor must be sanded	Easy to patch repair



Fire safety

- Health buildings have highest risk class (TEK 17)
 - => strong requirements to fire safety
 - => use of flame retardants



Summary

- Specific coatings for specific areas and components
- Lime/chalk/soap
 - Almost no protection => ceiling, (paneling)
 - Tendency to yellowing
 - Recommended to use white-pigmented oils
- Oil/wax
 - Little protection => paneling, ceiling
- Hardwax
 - Good protection, easy repair => floor
- Lacquer/paint
 - High protection, difficult repair => floor



Research needs

- Better documentation on the water vapor diffusion of different coatings
- Development of coatings with high water vapor diffusion and resistance
- Design guidelines for wood products and their surface treatments for health buildings and other public buildings



**Thank you very
much for your
attention!**