Mass Timber Moisture Management

Presented by COLIN SHANE | Principal

July 2024

Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.

About RDH Building Science

Making Buildings Better™

FOUNDED IN 1997

RDH is a building science consulting and engineering firm delivering climate-responsive solutions with 11 locations across North America.


DUPONT
Tyvek
HomeWrap


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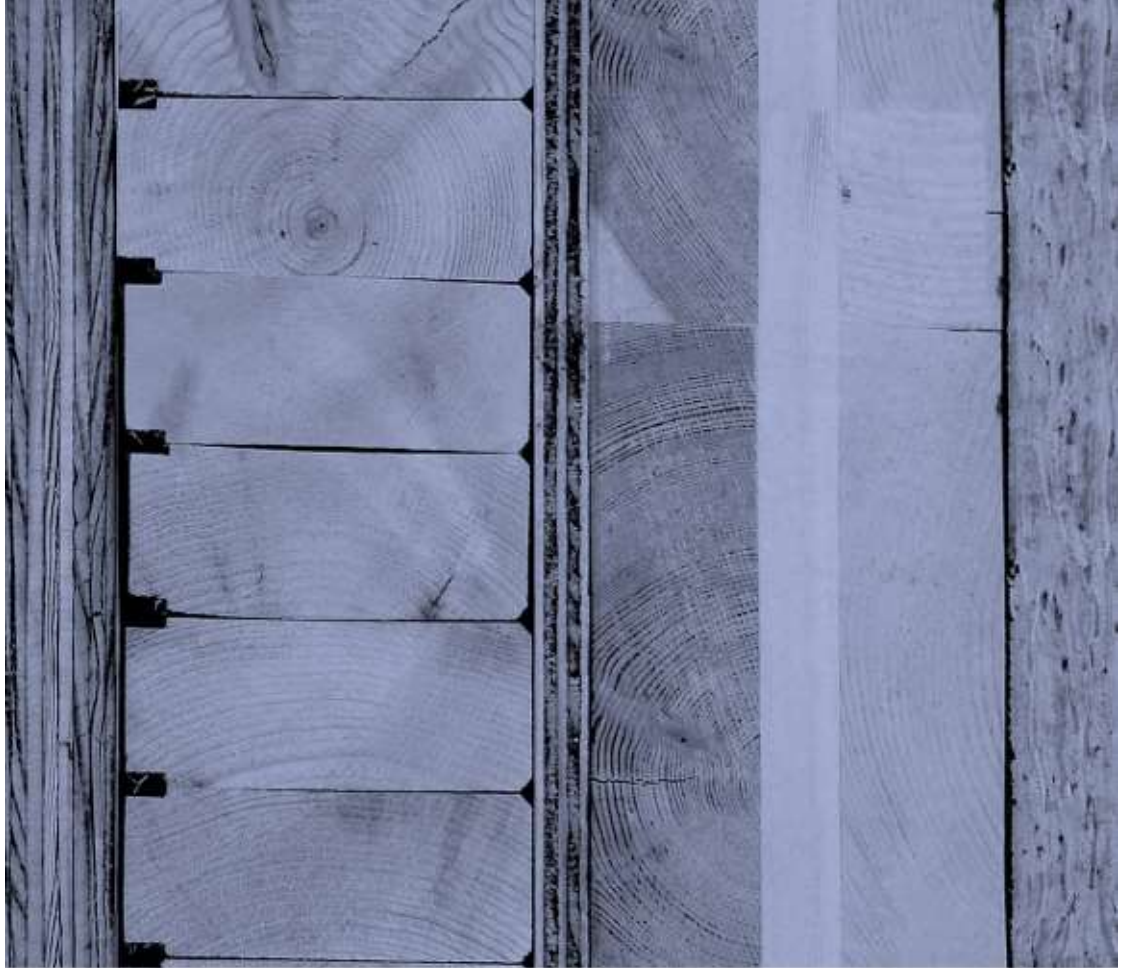

MOISTURE RISK MANAGEMENT STRATEGIES FOR MASS TIMBER BUILDINGS

A guide for designers, construction professionals, and building developers

RDH BUILDING SCIENCE

OCTOBER 2022 | V2.1

MASS TIMBER BUILDING ENCLOSURE BEST PRACTICE DESIGN GUIDE

A guide for designers, construction professionals, and building developers

RDH BUILDING SCIENCE

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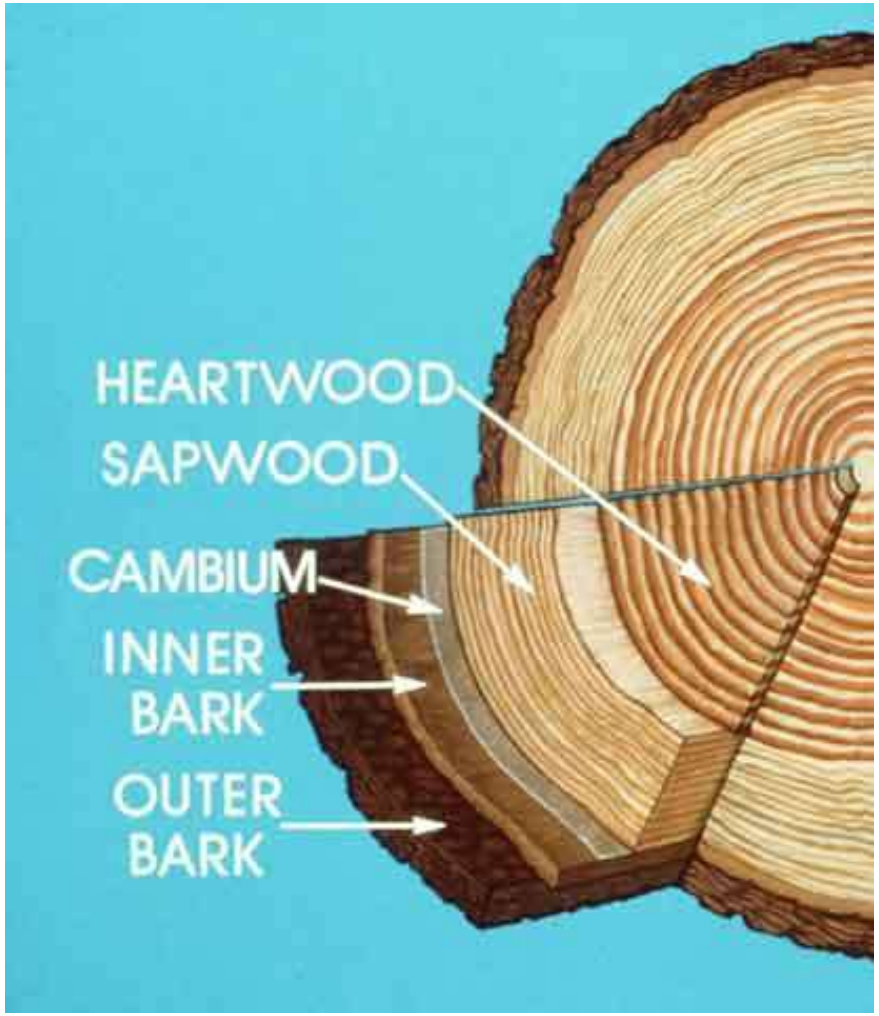
WOOD + MOISTURE

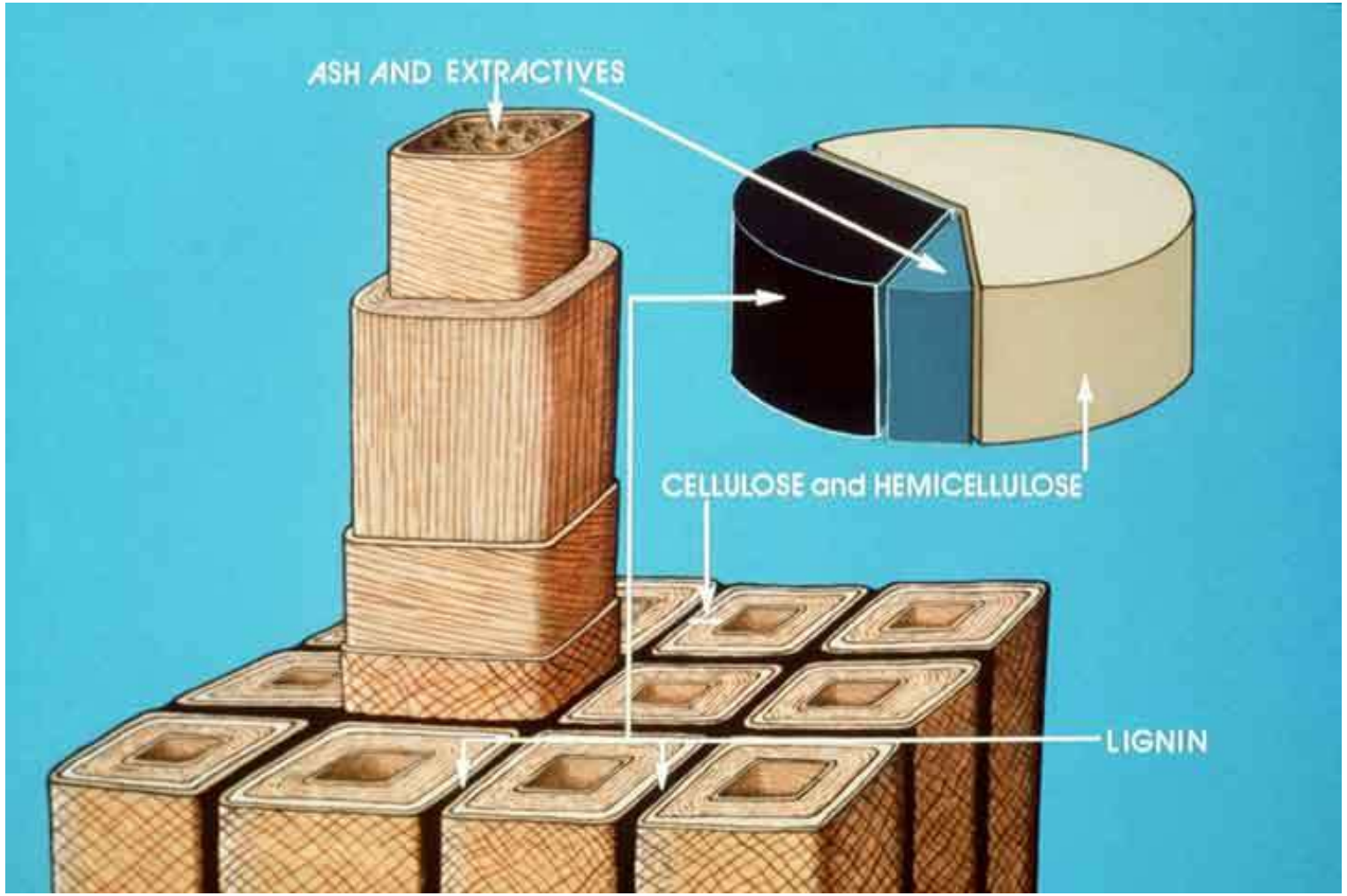
Do we care if it rains?

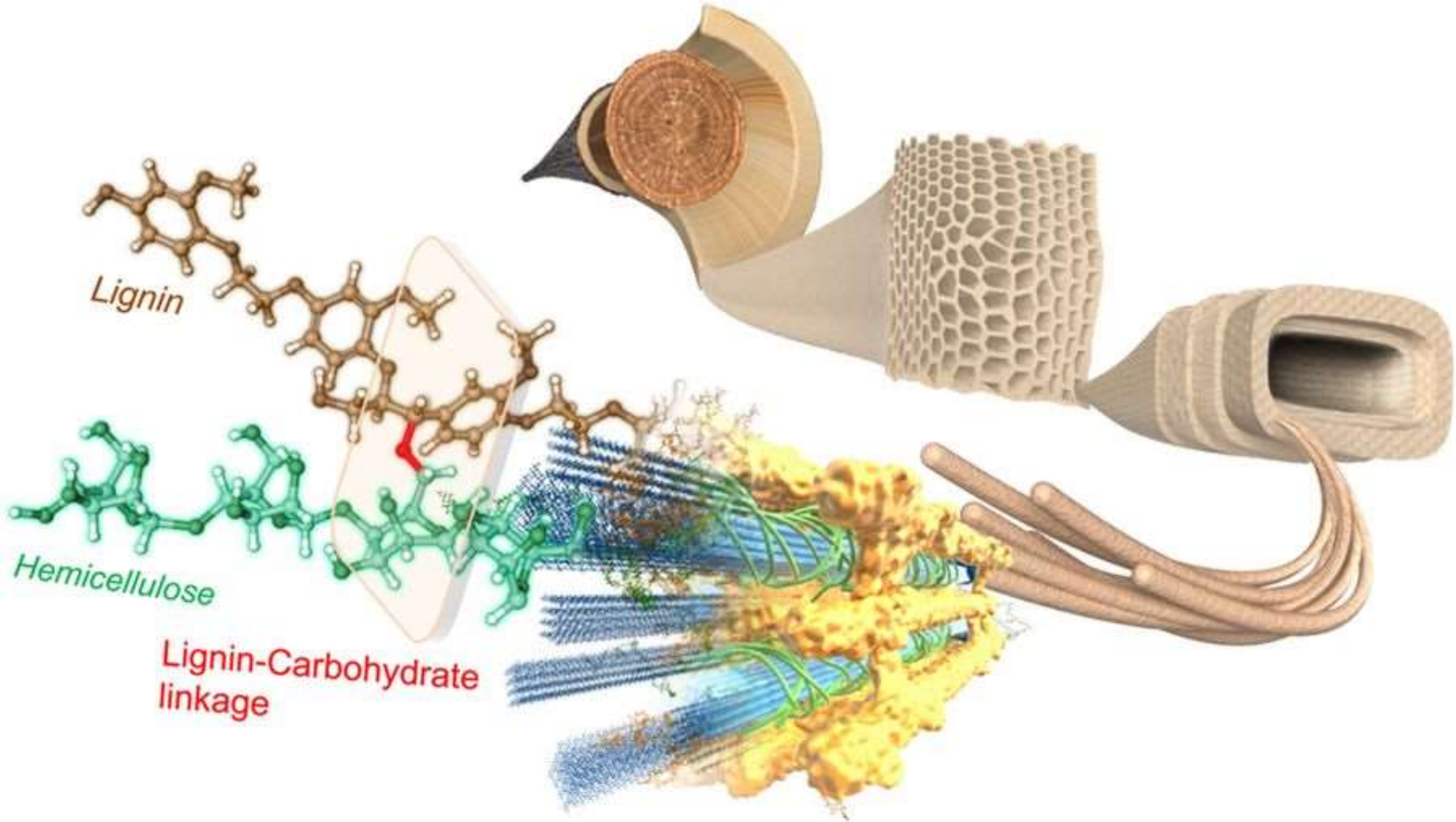

Do we care if it rains?

Wood + Moisture + Time

Wood Material Properties

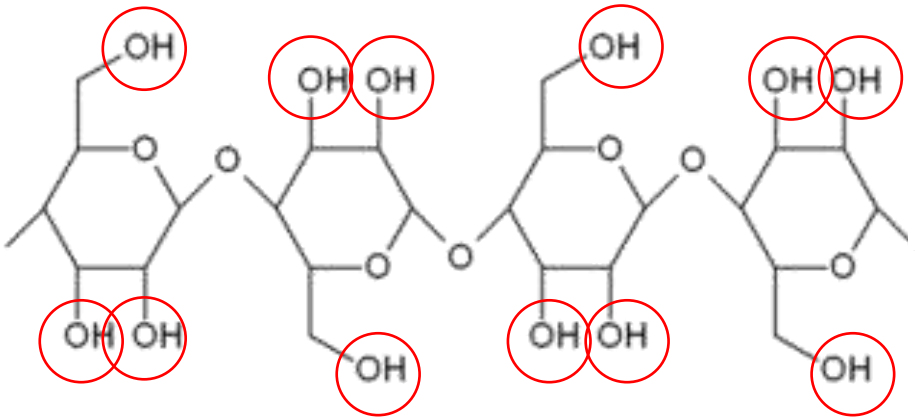


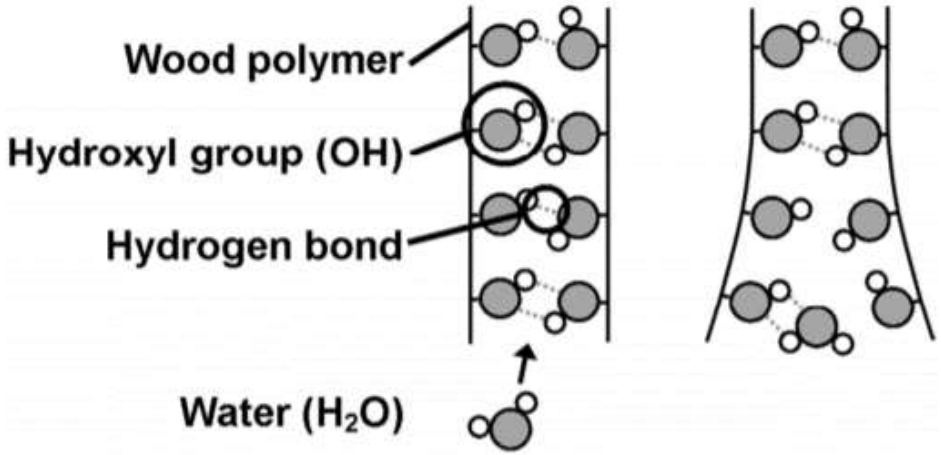


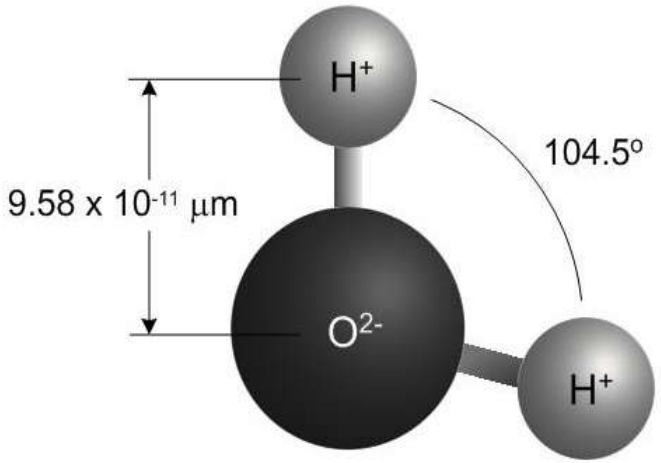

Lignin
Hemicellulose
Lignin-Carbohydrate
linkage

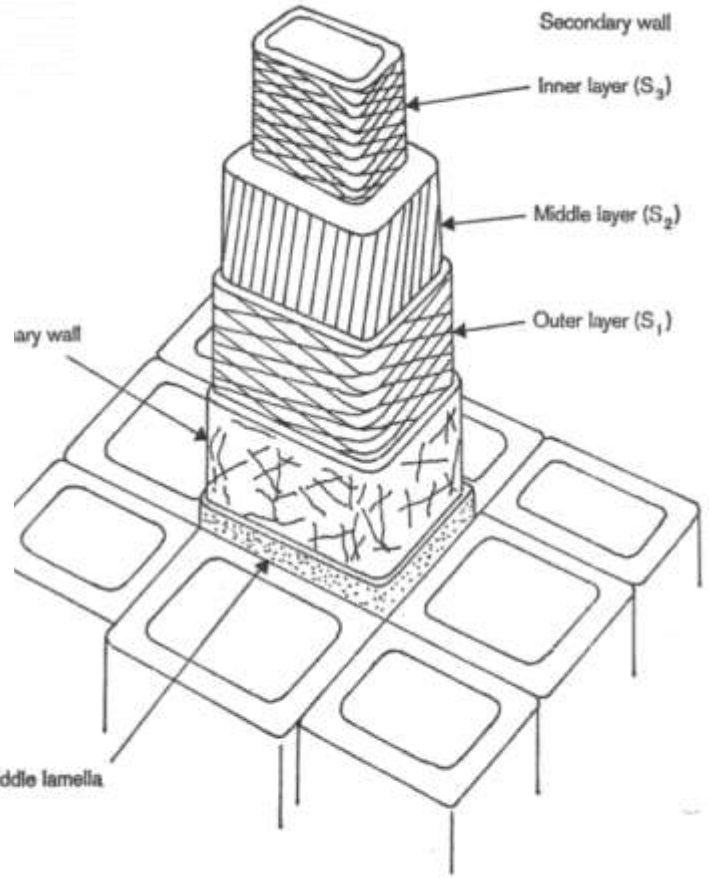
Small Stuff

- Wood Cell
  - Cellulose (42±2%)
  - Hemicellulose (27±2%)
  - Lignin (28±3%)
- Cellulose Structure
  - OH: Hydroxyl group
  - H_2O: Polar molecule









FPL, 2010
Engelund, E., 2011

Wood & Water

Free Water (Capillary Water):

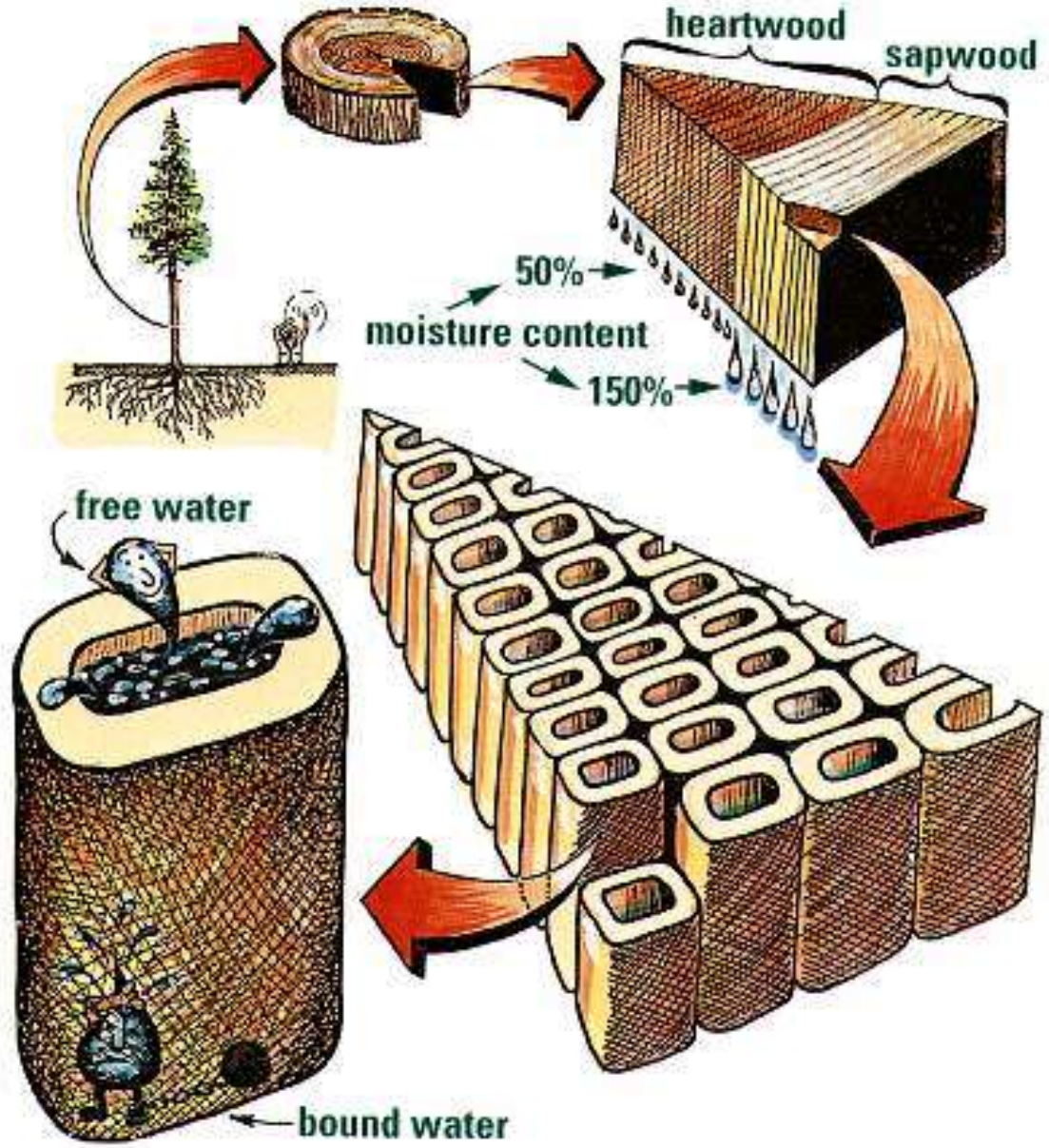
- Liquid water in the cell lumina
- Properties similar to bulk water
- Has little impact on wood properties

Bound Water (hygroscopic water)

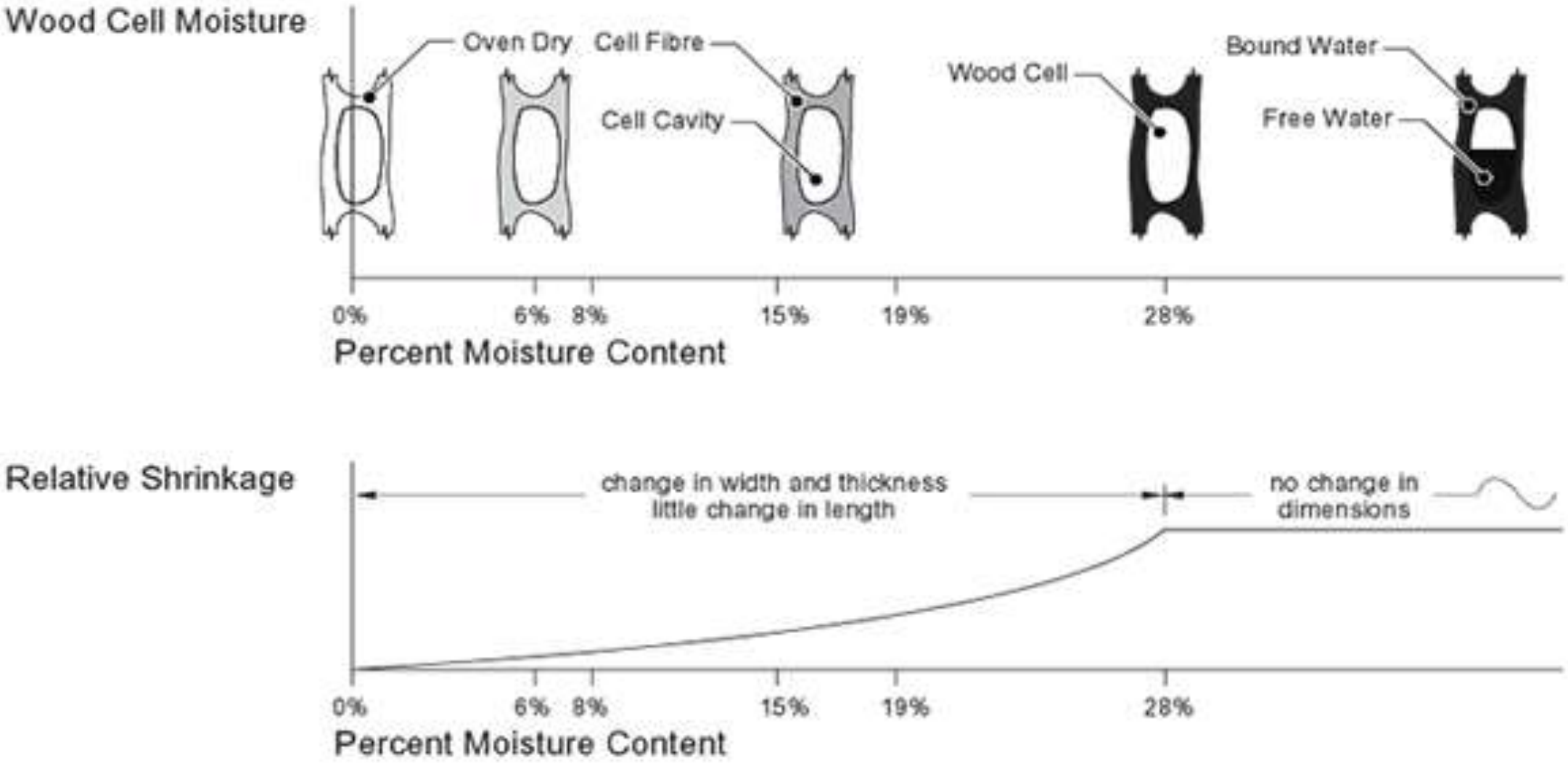
- In cell walls
- Gain/loss affects wood properties

Fiber Saturation Point

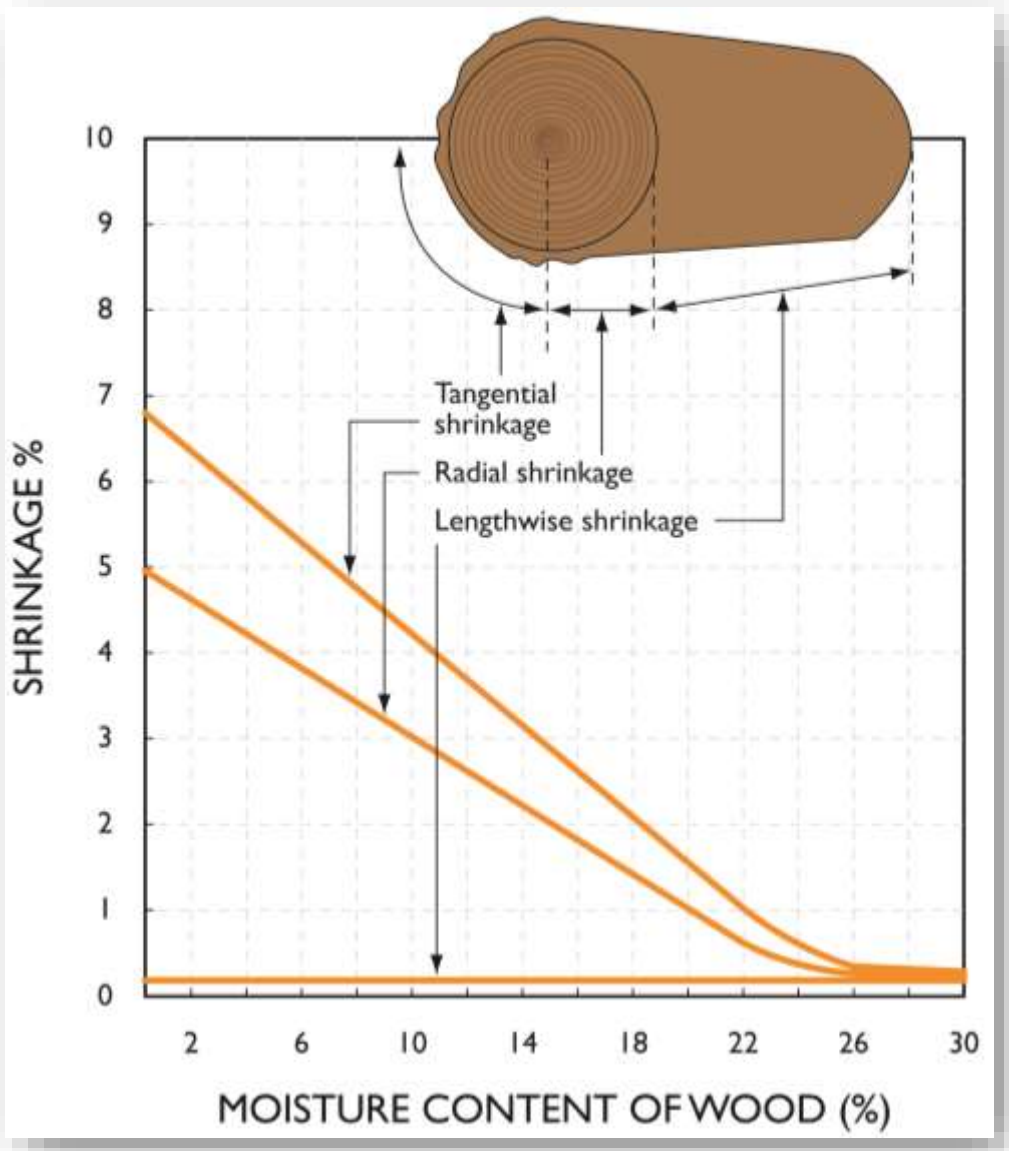
- Cell walls completely saturated with bound water but no free water in the cell lumina
- 26-30% moisture content (MC)

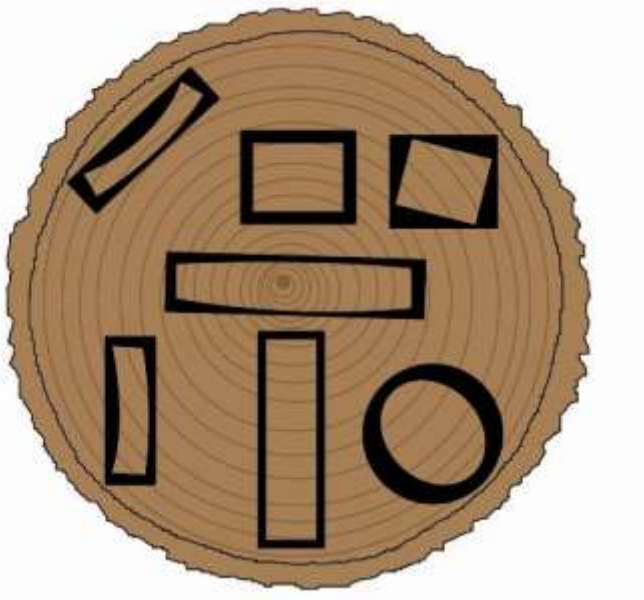


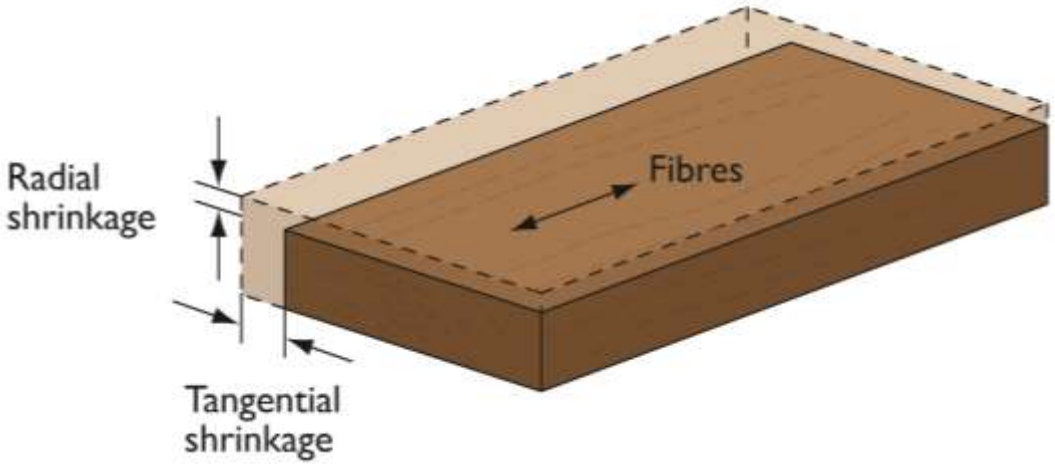
Wood & Water


Wood Cell Moisture
Oven Dry
Cell Fibre
Cell Cavity
Wood Cell
Bound Water
Free Water
0%
6%
8%
15%
19%
28%
Percent Moisture Content
Relative Shrinkage
change in width and thickness
little change in length
no change in
dimensions
0%
6%
8%
15%
19%
28%
Percent Moisture Content

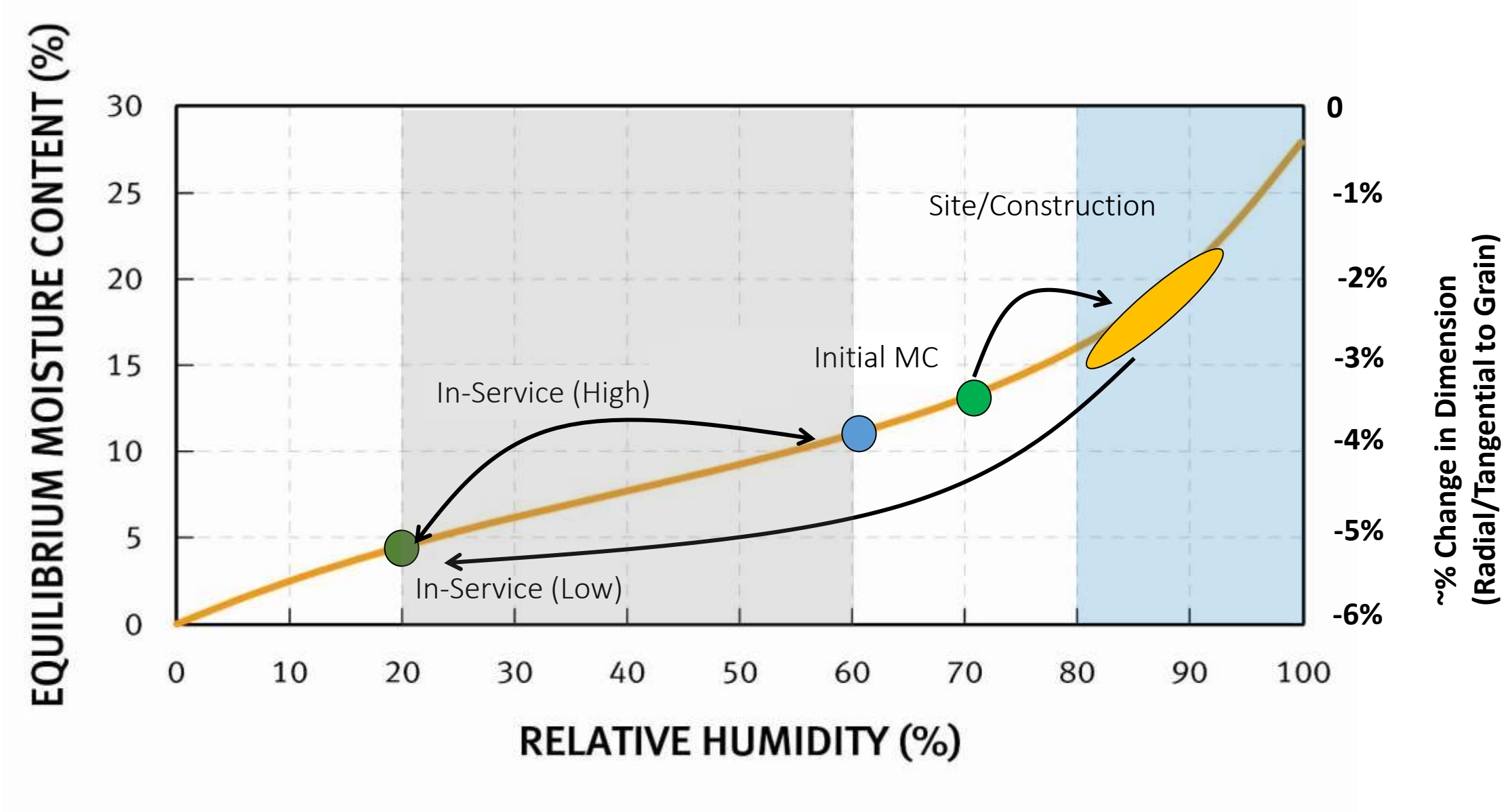
Behaviour of Wood in Construction



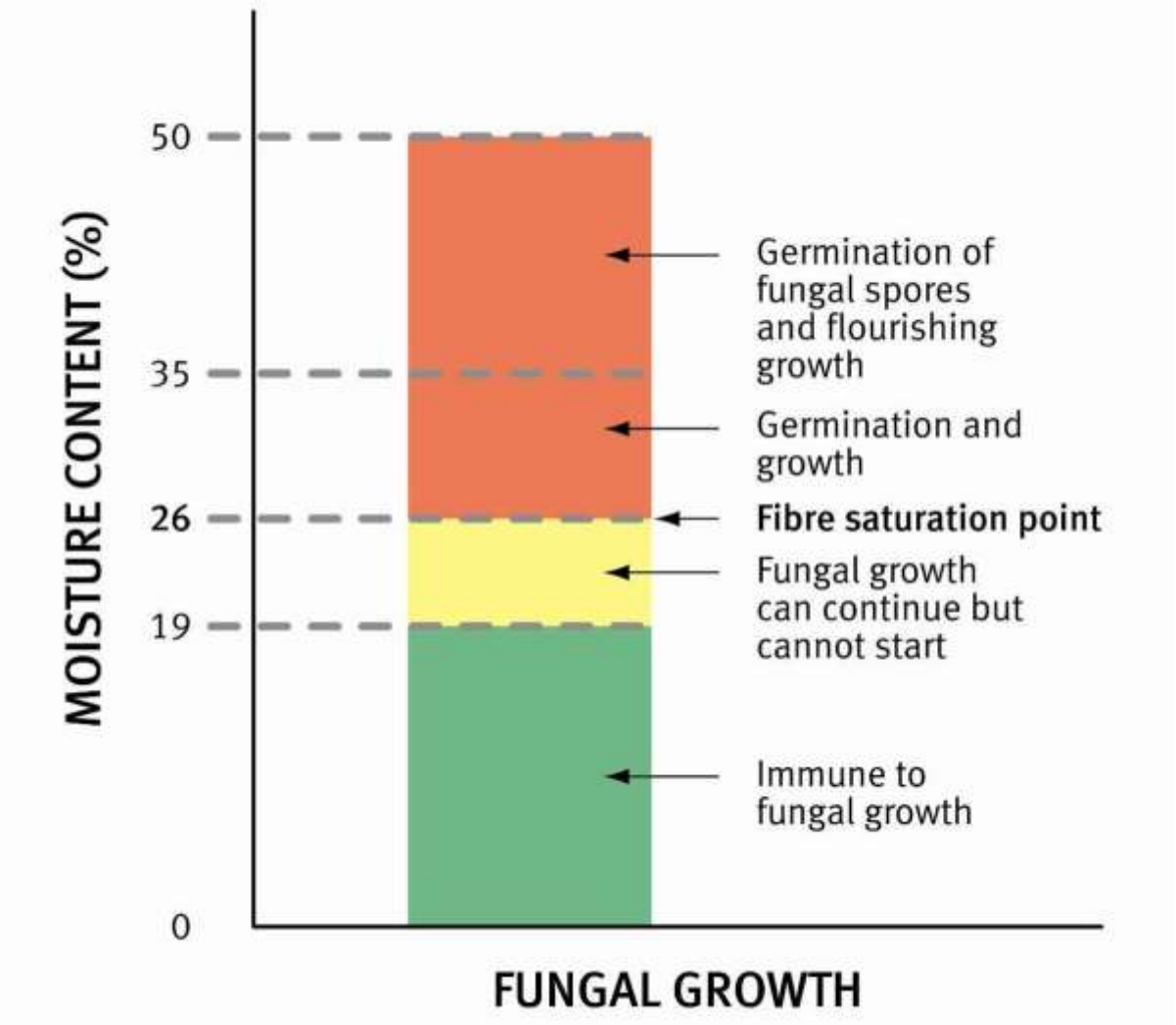




Wood Moisture Content, Relative Humidity & Movement



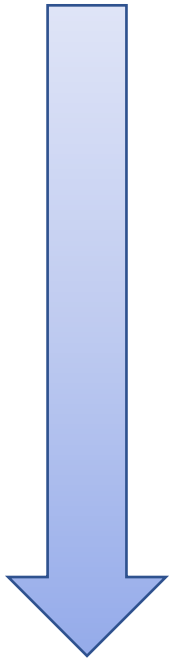
Wood Decay Thresholds & Wood MC



- Spores of decay fungi will germinate at 26-28% wood MC and flourish when moisture content is between 35 and 50% (above fibre-saturation)
- Optimal temperature range is 18 to 35C (stops at 38C)
- Spores will not germinate on wood with low MC

Various “Limit States” - Durability to Aesthetic

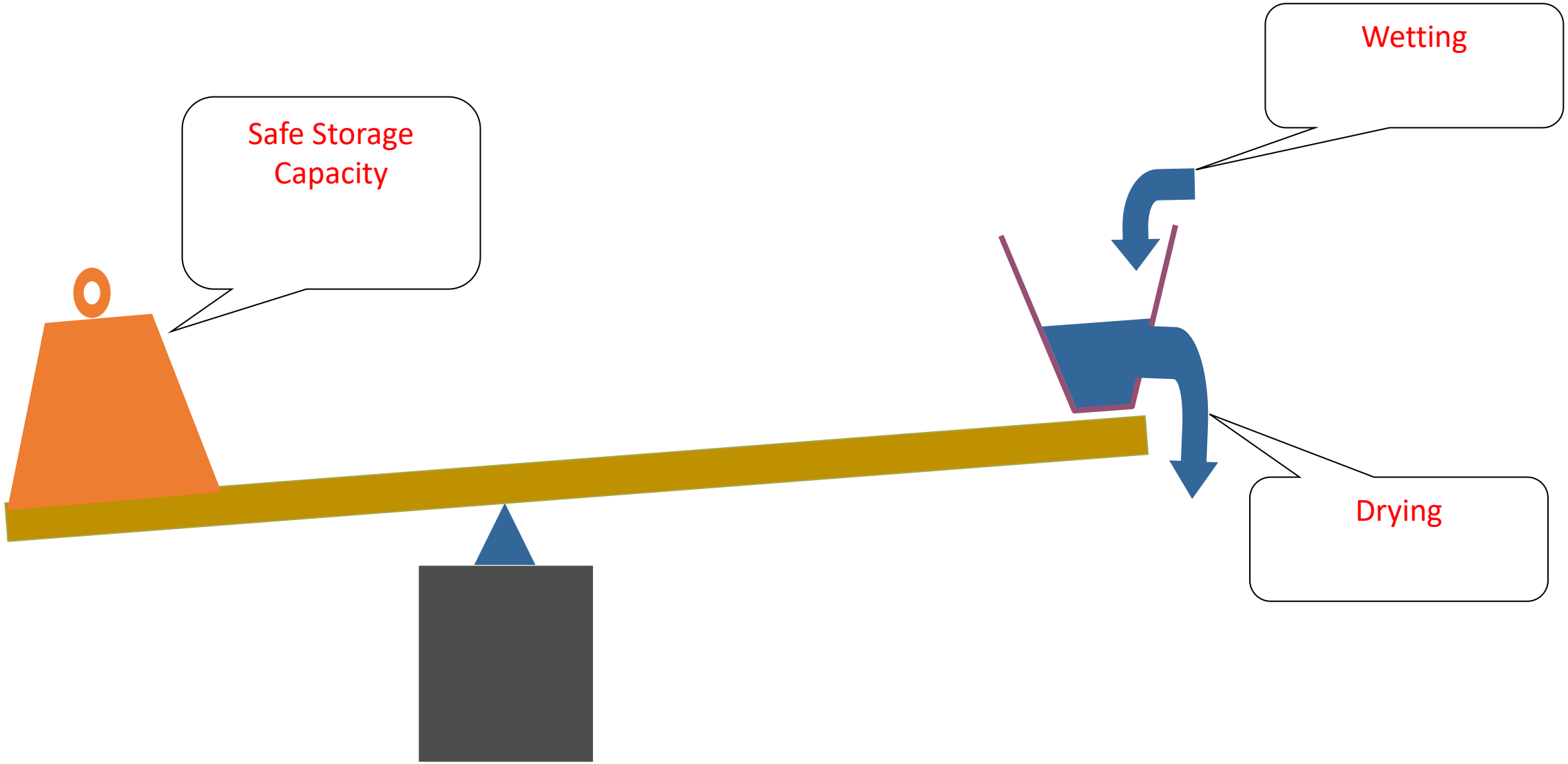
- Water exposure from rainwater and elevated Relative Humidity (RH)
  - Water stains, wood tannin movement
  - Swelling/drying, checking & distortion of wood and finishes
  - Corrosion of fasteners
  - Staining fungi (undesirable for aesthetics)
  - Fungi (harmful to human health)
  - Decay fungi (damaging to wood)



Increasing RH and exposure to liquid water, water absorption, elevated moisture contents for longer periods of time

(Intensity, Duration, Frequency)

Wetting & Drying


Safe Storage Capacity
Wetting
Drying

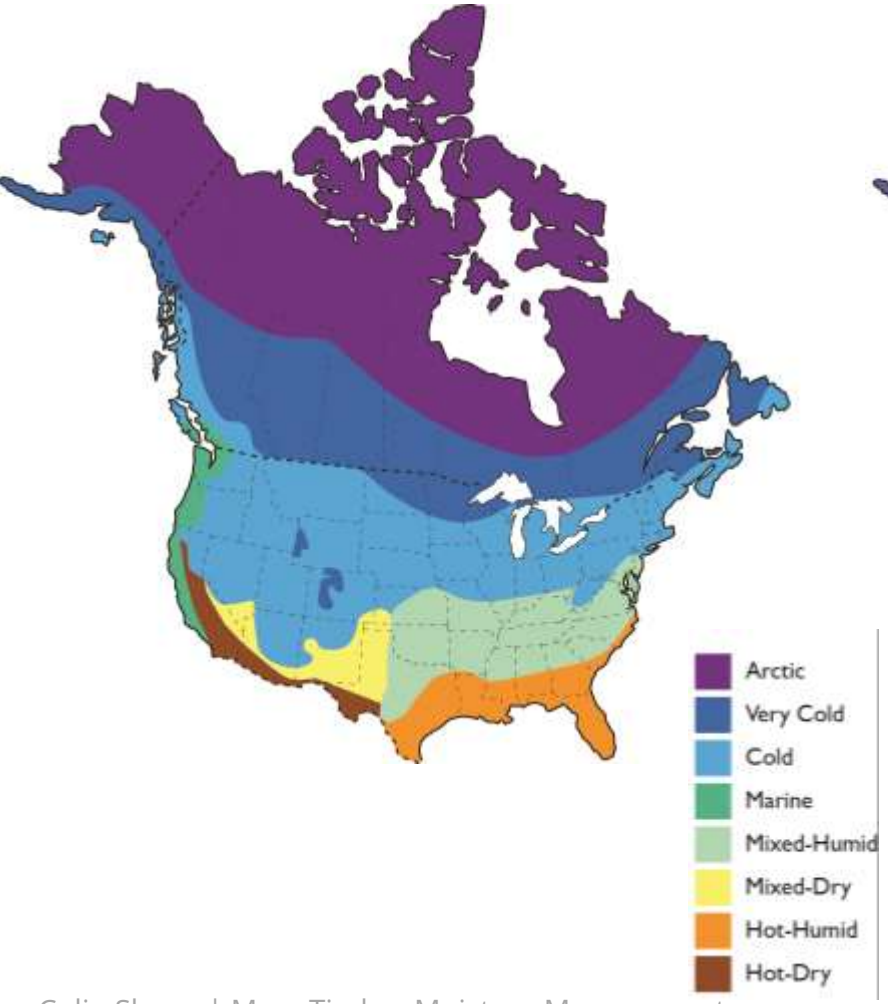
Moisture Risks to Mass Timber Buildings

- **Exposure to moisture during construction**
  - Supply
  - Handling on site
  - Construction sequence

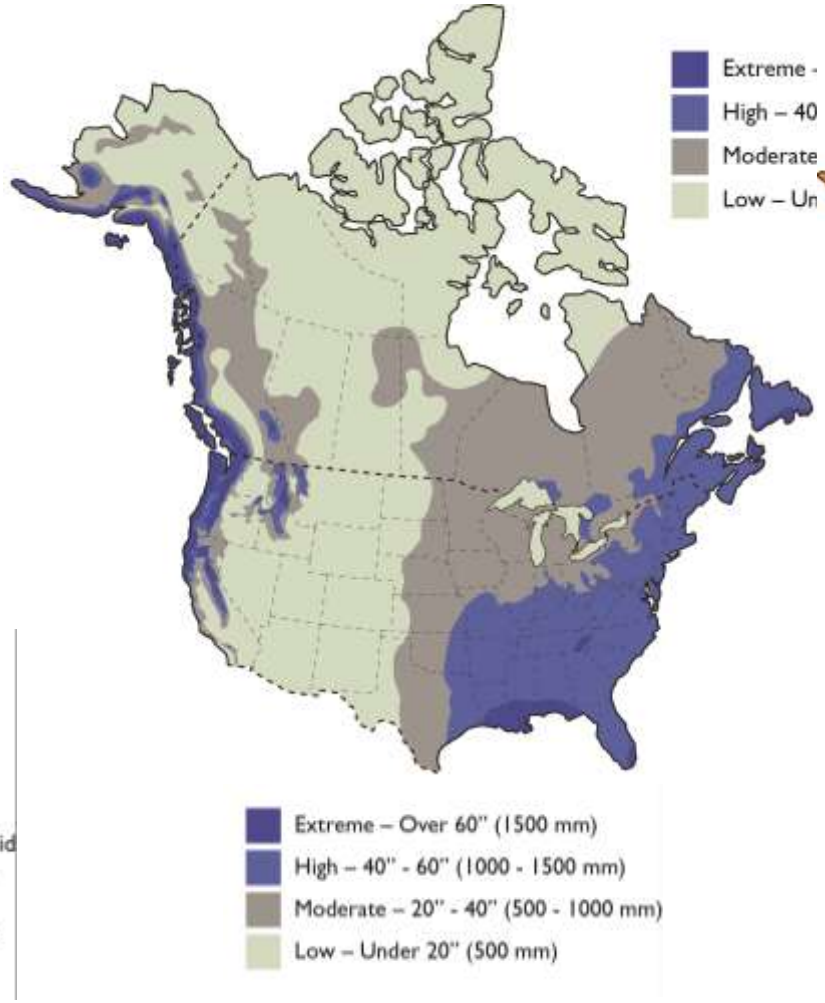
- **Exposure to moisture during operation**
  - Accidental water leaks (sprinklers/plumbing)
  - Long term small water leaks (plumbing)
  - Relative Humidity

Environmental Loads - Climate

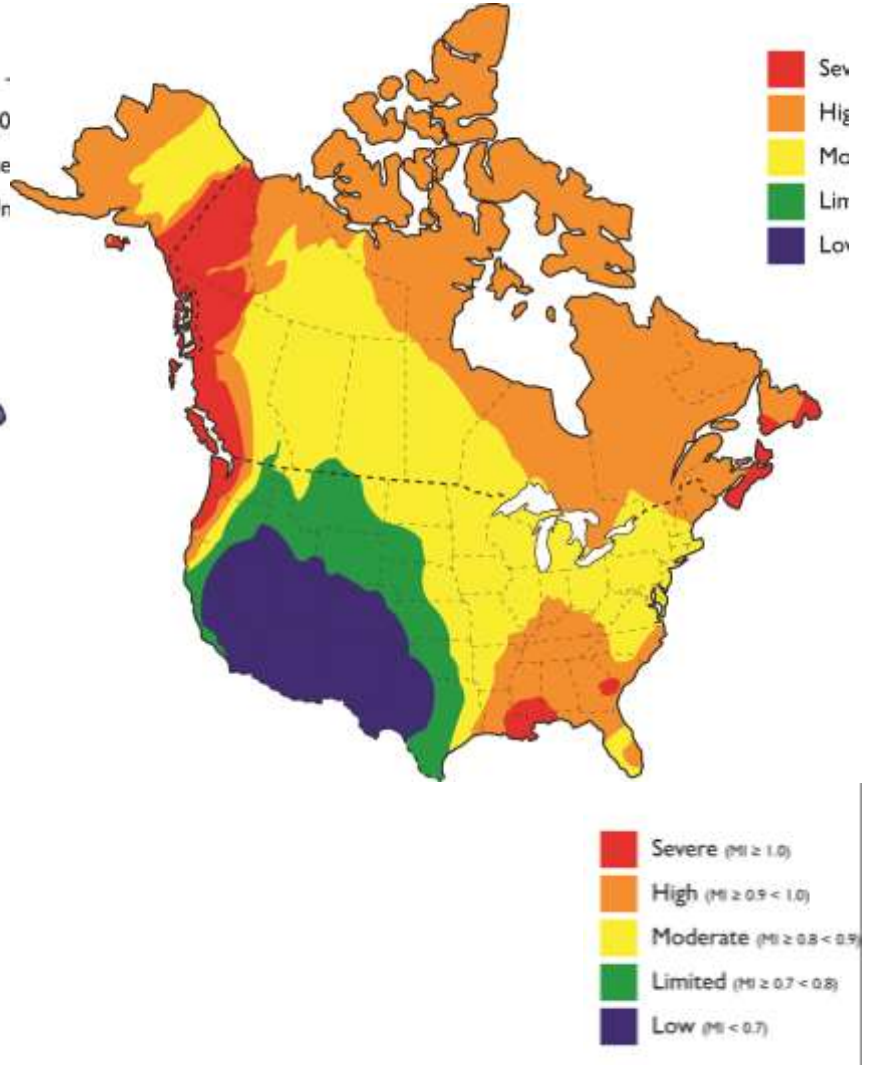
General



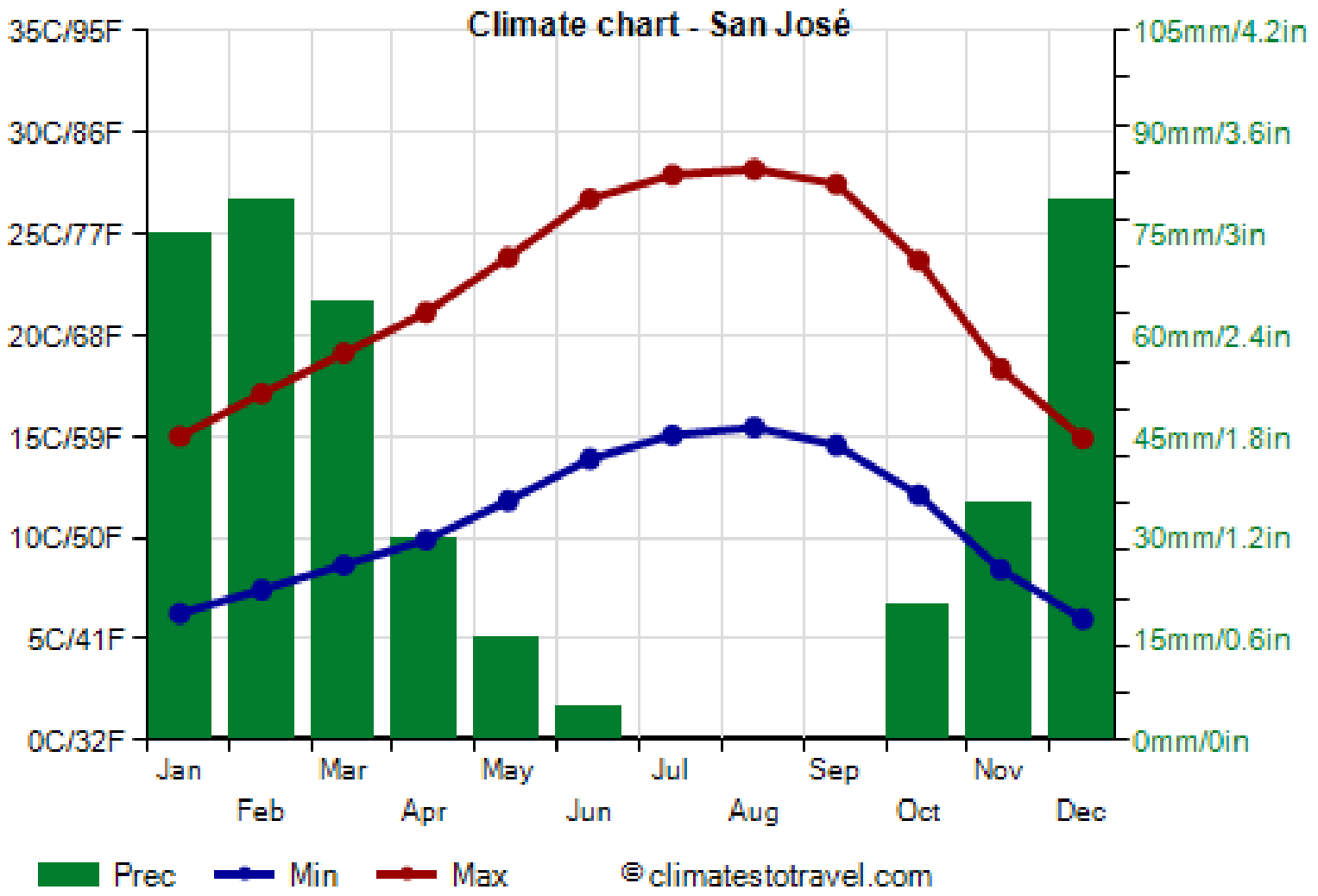
Rainfall



Moisture Index



Construction schedule risks?



Understanding the Local Climate

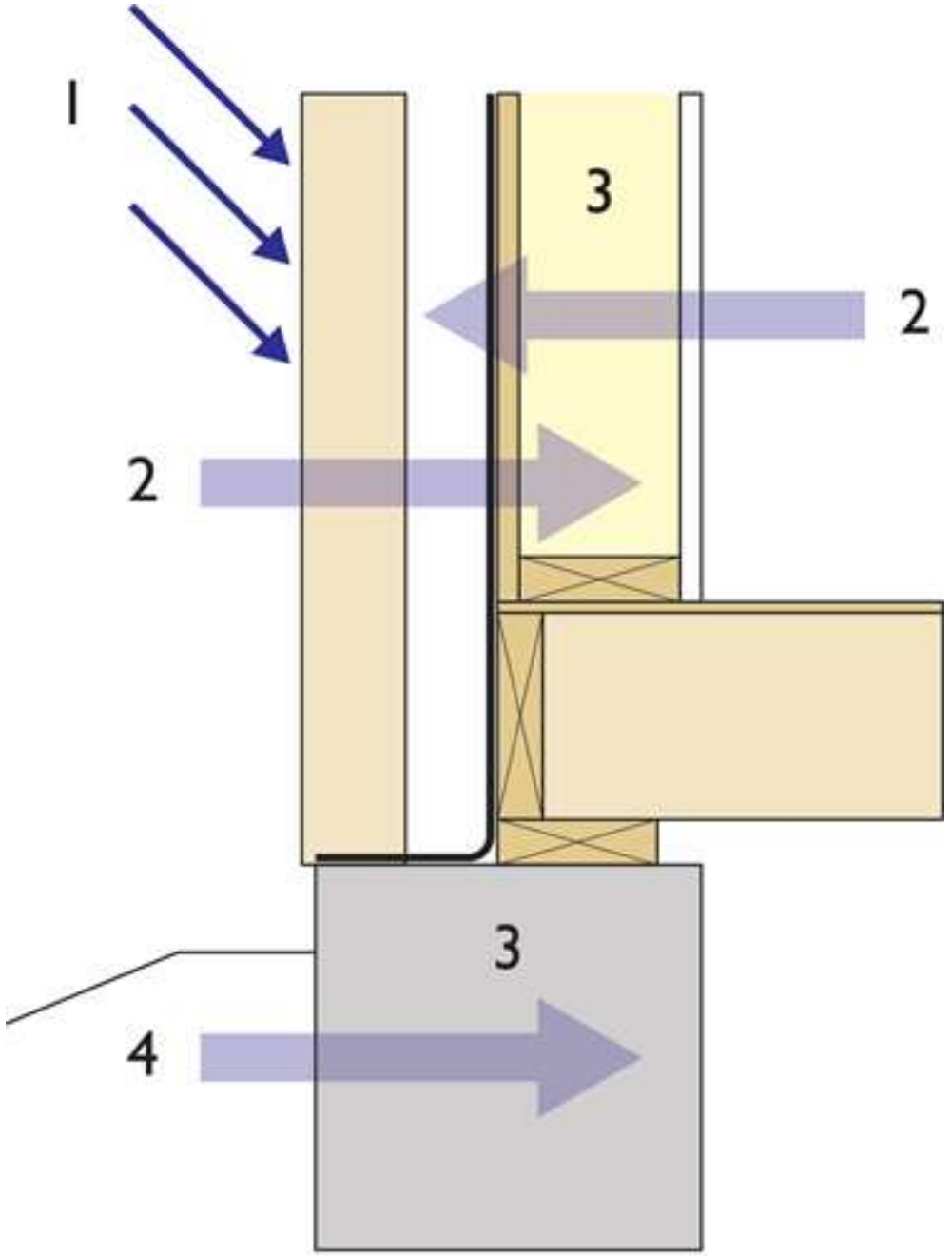
V·T·E Climate data for Miami International Airport, 1991–2020 normals,[a] extremes 1895–present[b] [hide]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	88 (31)	89 (32)	93 (34)	97 (36)	98 (37)	98 (37)	100 (38)	98 (37)	97 (36)	95 (35)	91 (33)	89 (32)	100 (38)
Mean maximum °F (°C)	84.4 (29.1)	85.8 (29.9)	89.0 (31.7)	90.7 (32.6)	92.8 (33.8)	94.2 (34.6)	94.7 (34.8)	94.5 (34.7)	93.2 (34.0)	90.9 (32.7)	87.0 (30.6)	84.9 (29.4)	95.8 (35.4)
Average high °F (°C)	76.2 (24.6)	78.2 (25.7)	80.6 (27.0)	83.6 (28.7)	86.7 (30.4)	89.3 (31.8)	90.6 (32.6)	90.7 (32.6)	89.0 (31.7)	85.9 (29.9)	81.3 (27.4)	78.2 (25.7)	84.2 (29.0)
Daily mean °F (°C)	68.6 (20.3)	70.7 (21.5)	73.1 (22.8)	76.7 (24.8)	80.1 (26.7)	82.8 (28.2)	84.1 (28.9)	84.2 (29.0)	83.0 (28.3)	80.1 (26.7)	74.8 (23.8)	71.2 (21.8)	77.4 (25.2)
Average low °F (°C)	61.0 (16.1)	63.2 (17.3)	65.6 (18.7)	69.8 (21.0)	73.4 (23.0)	76.3 (24.6)	77.5 (25.3)	77.7 (25.4)	76.9 (24.9)	74.2 (23.4)	68.3 (20.2)	64.3 (17.9)	70.7 (21.5)
Mean minimum °F (°C)	45.1 (7.3)	48.5 (9.2)	52.3 (11.3)	59.6 (15.3)	66.7 (19.3)	71.5 (21.9)	72.5 (22.5)	72.8 (22.7)	72.7 (22.6)	65.0 (18.3)	55.7 (13.2)	49.7 (9.8)	42.5 (5.8)
Record low °F (°C)	28 (−2)	27 (−3)	32 (0)	39 (4)	50 (10)	60 (16)	66 (19)	67 (19)	62 (17)	45 (7)	36 (2)	30 (−1)	27 (−3)
Average precipitation inches (mm)	1.83 (46)	2.15 (55)	2.46 (62)	3.36 (85)	6.32 (161)	10.51 (267)	7.36 (187)	9.58 (243)	10.22 (260)	7.65 (194)	3.53 (90)	2.44 (62)	67.41 (1,712)
Average precipitation days (≥ 0.01 in)	7.7	6.5	6.3	6.9	10.8	17.6	17.3	19.4	18.1	13.8	8.6	8.0	141.0
Average relative humidity (%)	72.7	70.9	69.5	67.3	71.6	76.2	74.8	76.2	77.8	74.9	73.8	72.5	73.2
Average dew point °F (°C)	57.6 (14.2)	57.6 (14.2)	60.4 (15.8)	62.6 (17.0)	67.6 (19.8)	72.0 (22.2)	73.0 (22.8)	73.8 (23.2)	73.2 (22.9)	68.7 (20.4)	63.9 (17.7)	59.2 (15.1)	65.8 (18.8)
Mean monthly sunshine hours	219.8	216.9	277.2	293.8	301.3	288.7	308.7	288.3	262.2	260.2	220.8	216.1	3,154
Percent possible sunshine	66	69	75	77	72	70	73	71	71	73	68	66	71

Source: NOAA (relative humidity, dew point and sun 1961–1990),[6][18][19] The Weather Channel[20]

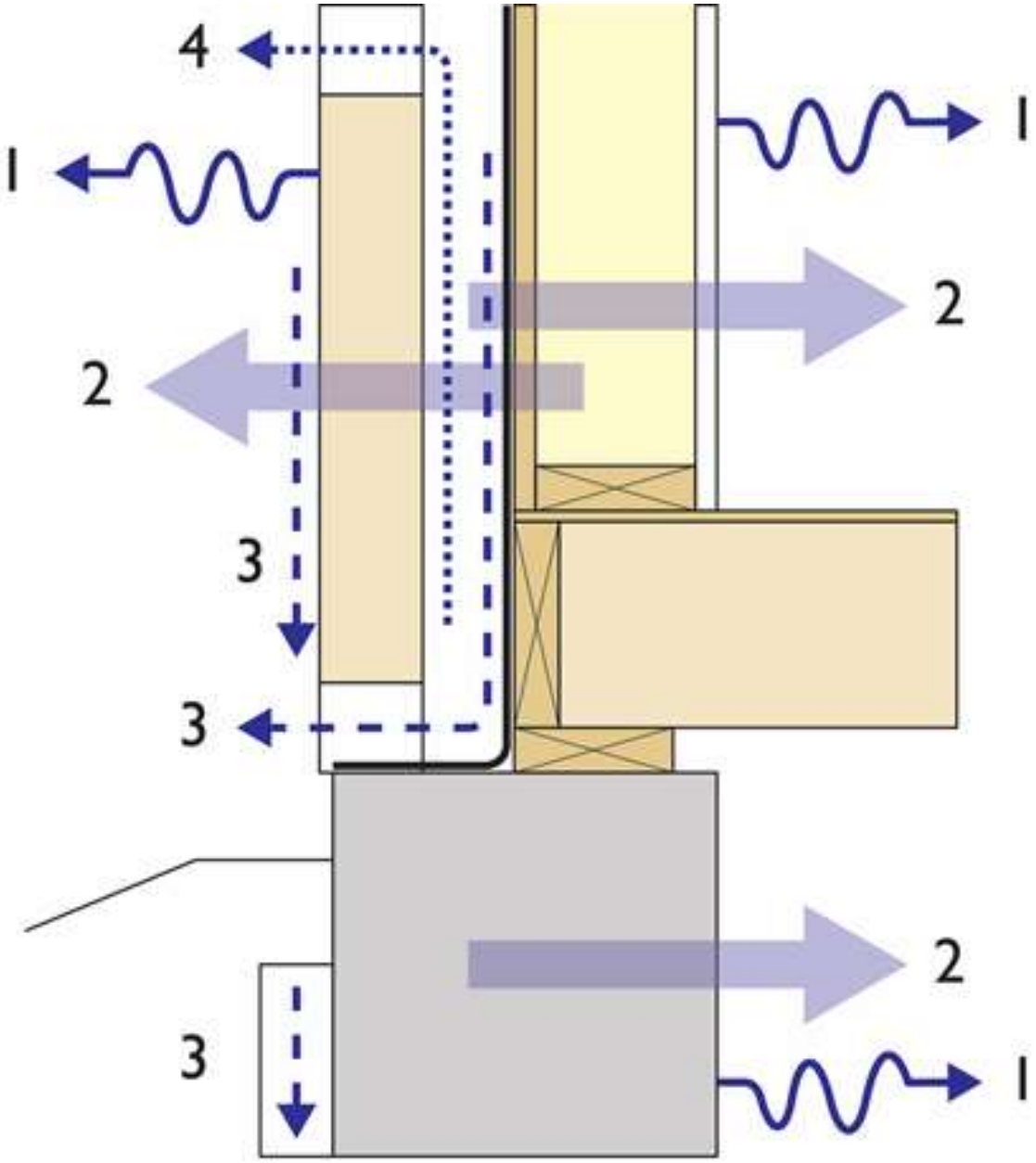
Wetting Mechanisms

1. Precipitation
2. Vapor / air movement
3. Construction moisture
4. Groundwater



Drying Mechanisms

1. Evaporation
2. Vapor / air movement
3. Drainage
4. Ventilation drying



Vapor Permeability

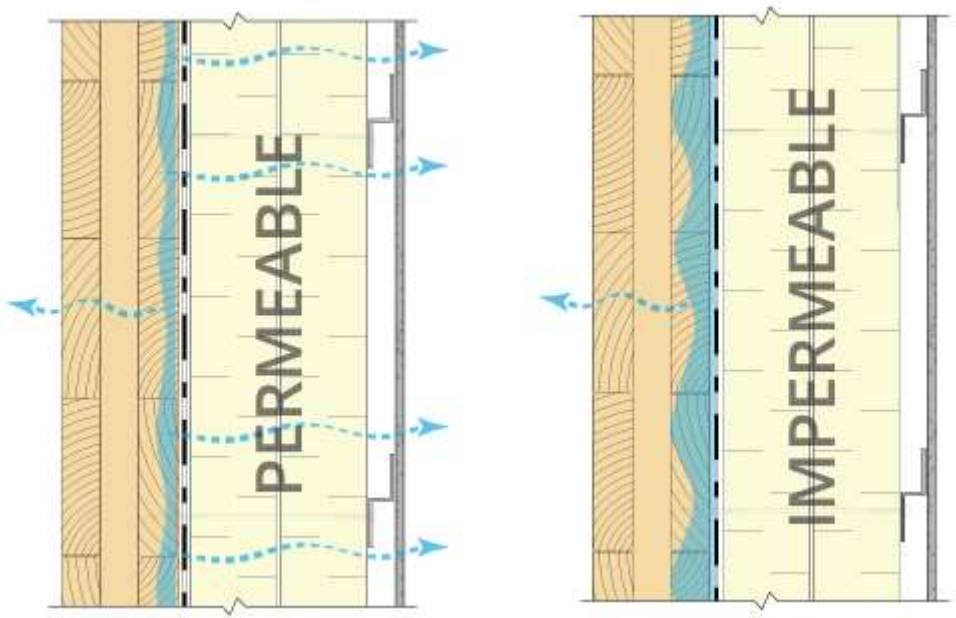


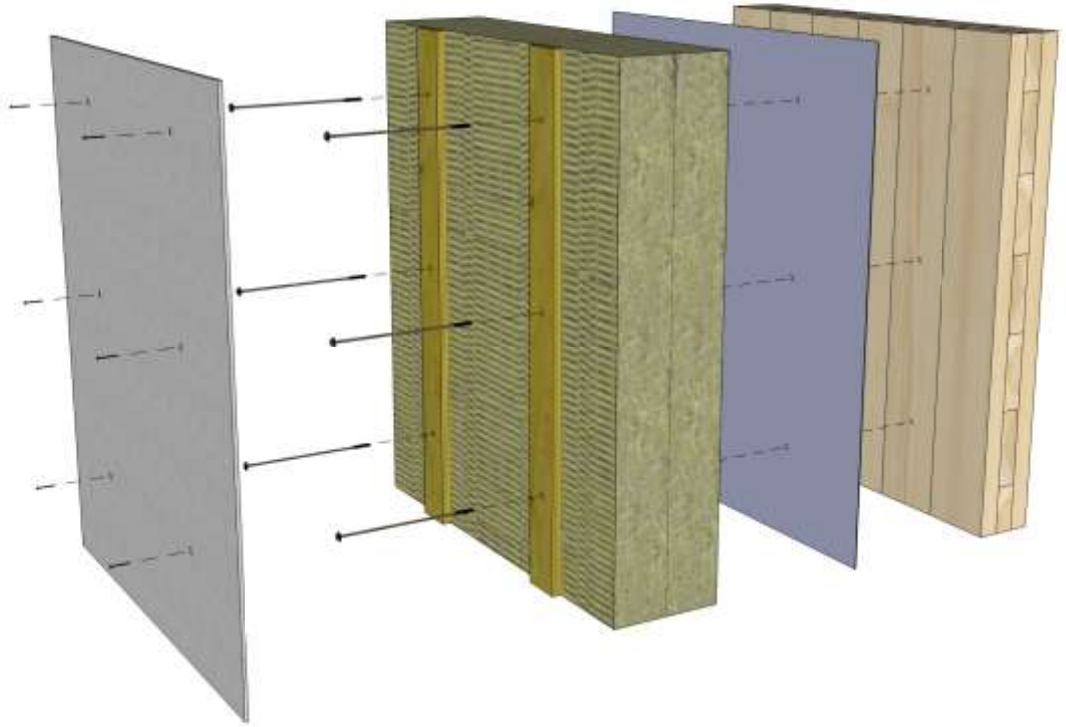
Table 5 *Vapor Permeance of CLT at Different Thicknesses and Relative Humidity Levels [16]*

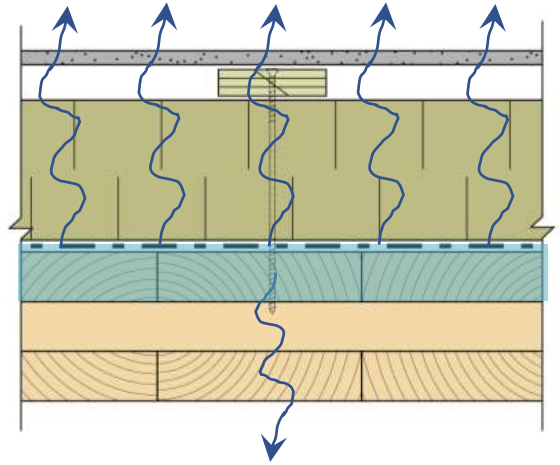
Relative Humidity	Vapor Permeance, US Perms		
	4 inches	6 inches	8 inches
20%	0.06	0.04	0.03
50%	0.31	0.21	0.15
80%	1.0	0.68	0.51

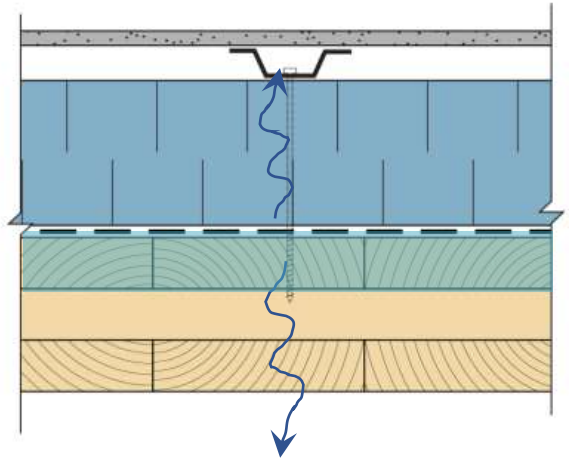
Table 6 *Vapor Permeance of MPP at Different Thicknesses and Relative Humidity Levels [10]. This table includes 1/2-inch plywood for reference.*

Relative Humidity	Vapor Permeance, US Perms			
	1/2 inch	4 inches	6 inches	8 inches
10%	0.21	0.027	0.018	0.013
30%	0.57	0.071	0.047	0.035
50%	1.5	0.19	0.13	0.10
70%	4.0	0.50	0.33	0.25
90%	11	1.4	0.91	0.69

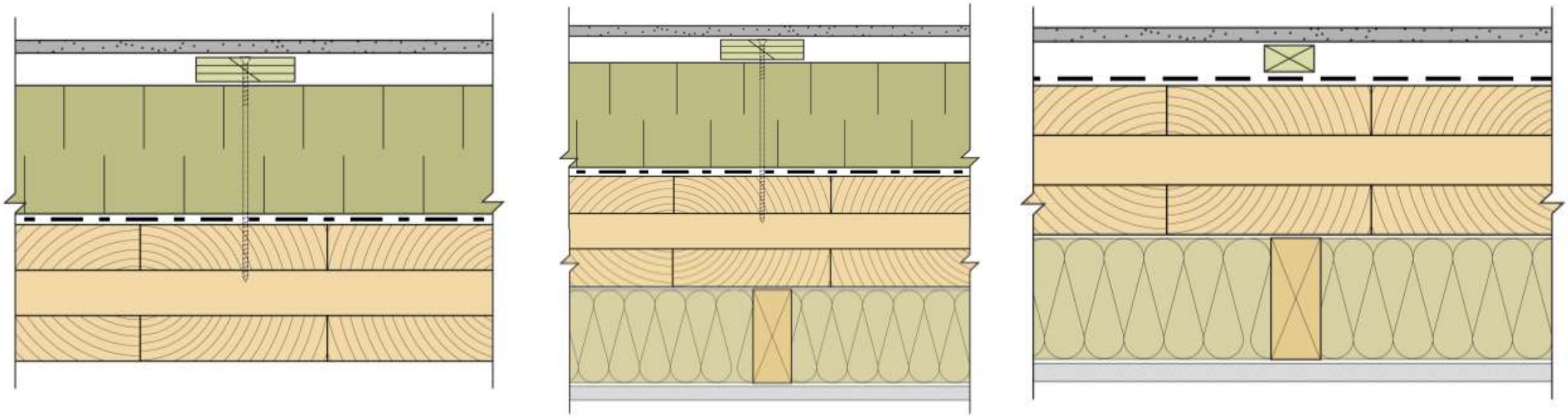
CLT Wall Design





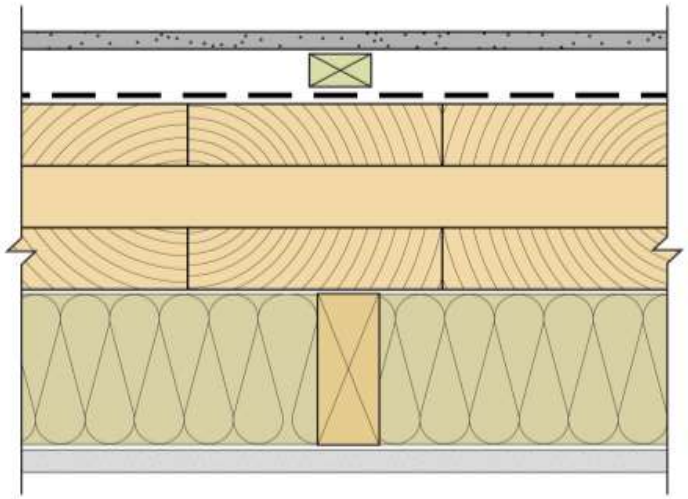


CLT Wall Considerations

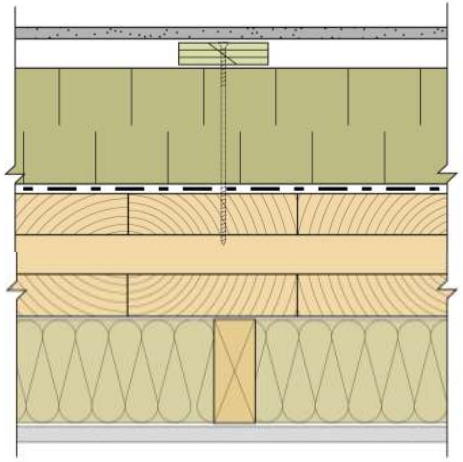


Best Placement & Insulation Type? – It Depends!

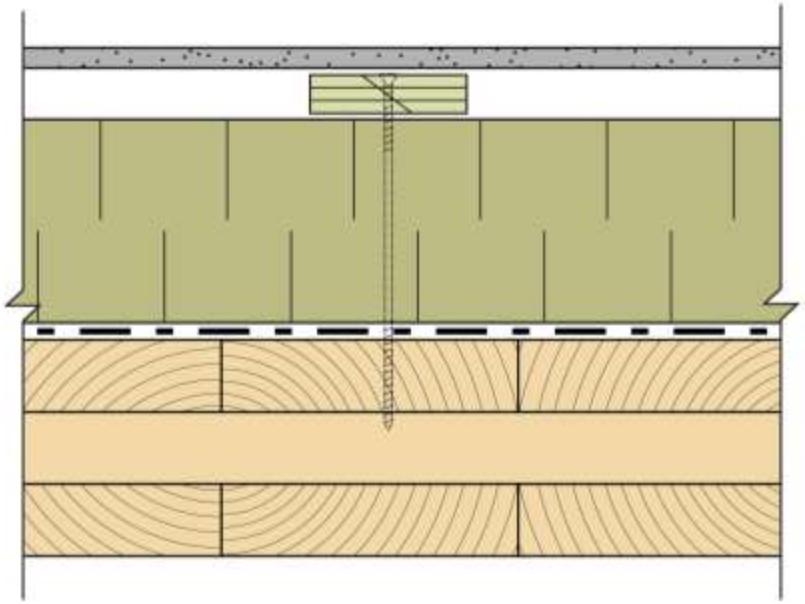
In Canada & North US (Climate Zones 4 through 8)



Poor Design – CLT cold & damp



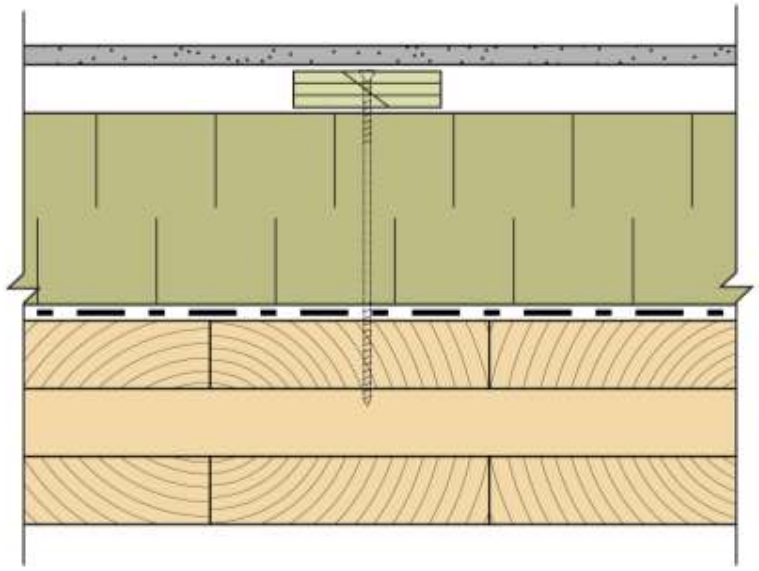
Acceptable, vapor open insulation & membranes on both sides though consider safe outboard to inboard insulation ratio to keep CLT dry from condensation



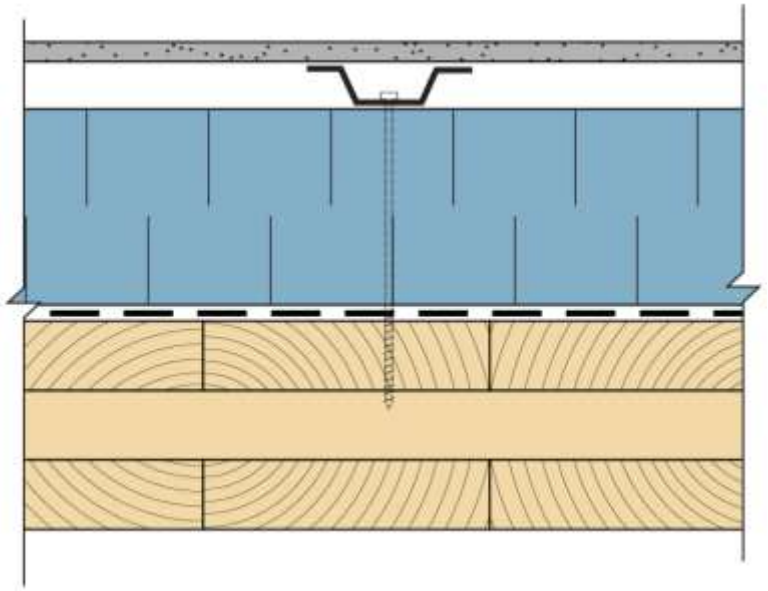
Best Practice, vapor open exterior insulation & sheathing membrane

In Canada & North US (Climate Zones 4 through 8)

Best Exterior Insulation Type for CLT?

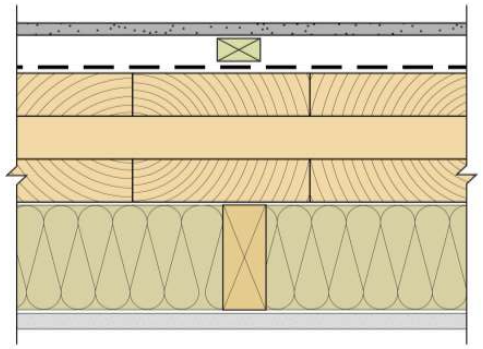


Best Practice, vapor open exterior insulation (mineral wool, or where fire code/climate permits wood-fibre)

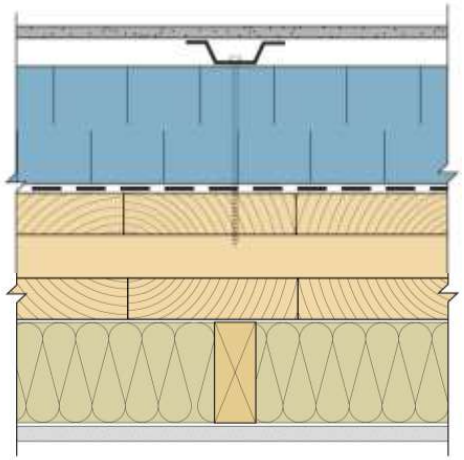


With caution (dry CLT and lower indoor RH), foam plastic including closed-cell sprayfoam insulation

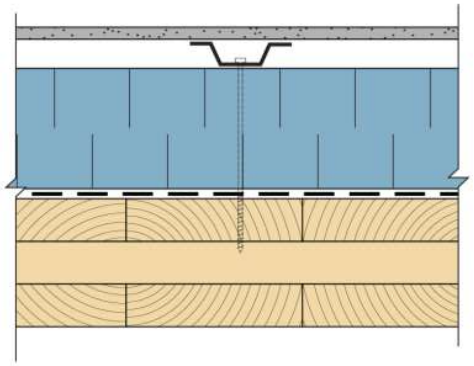
In Southern US (Climate Zones 1 through 3)



Okay in far south where high indoor vapour drive with appropriate exterior vapor control



Acceptable though may not need that much insulation & provided CLT initially dry

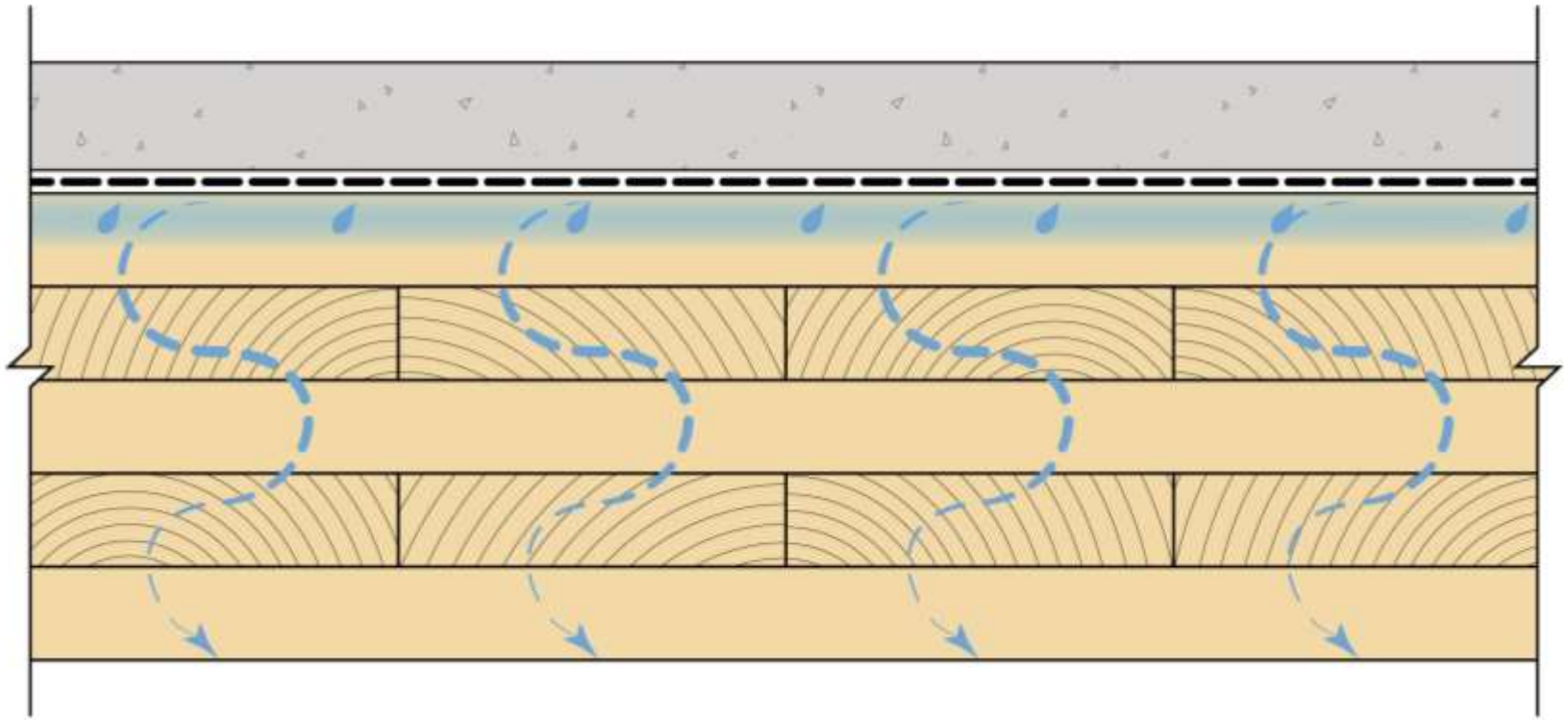


Acceptable provided CLT initially dry

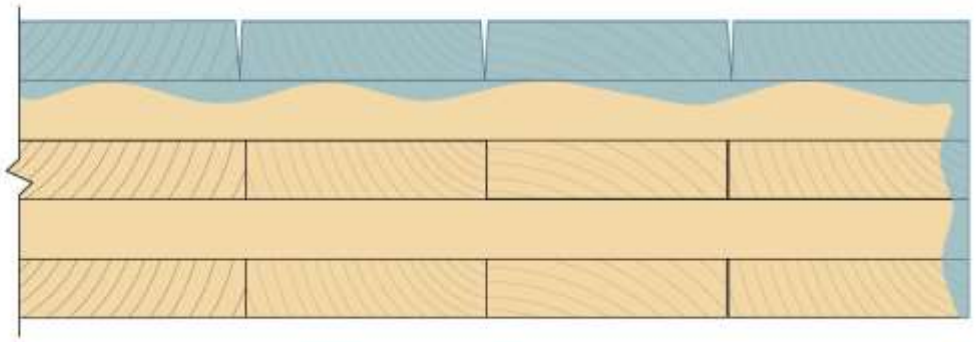
Floor Systems

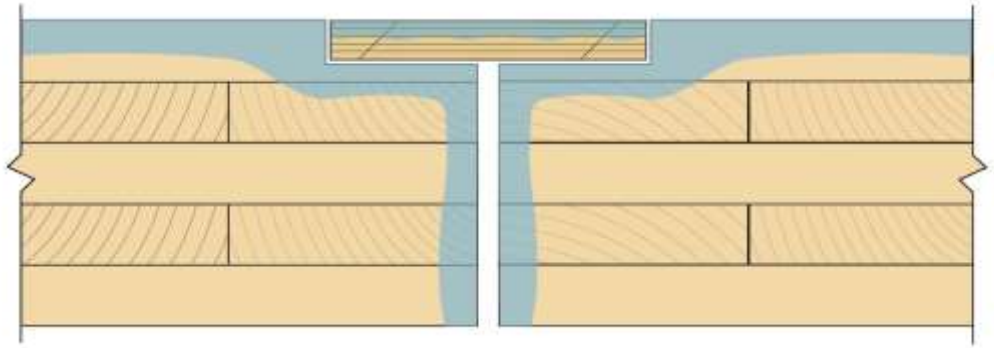
Floors + Acoustic Mats + Topping Slabs

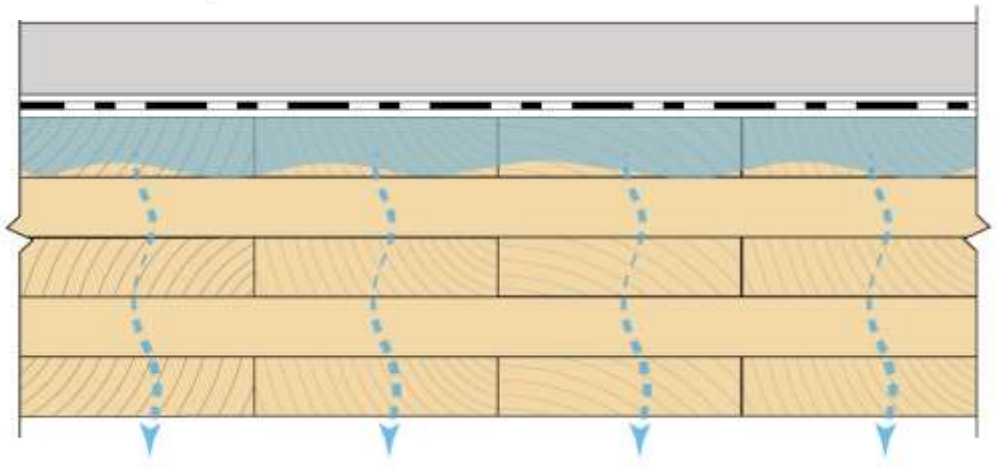
- Acoustic mats and toppings slabs also very vapor closed
- Limited ability to dry “up” or to dry “down” by vapor diffusion
- Need to be even more diligent about managing construction wetting
- Consider temporary protection measures
- Structural anchorage details

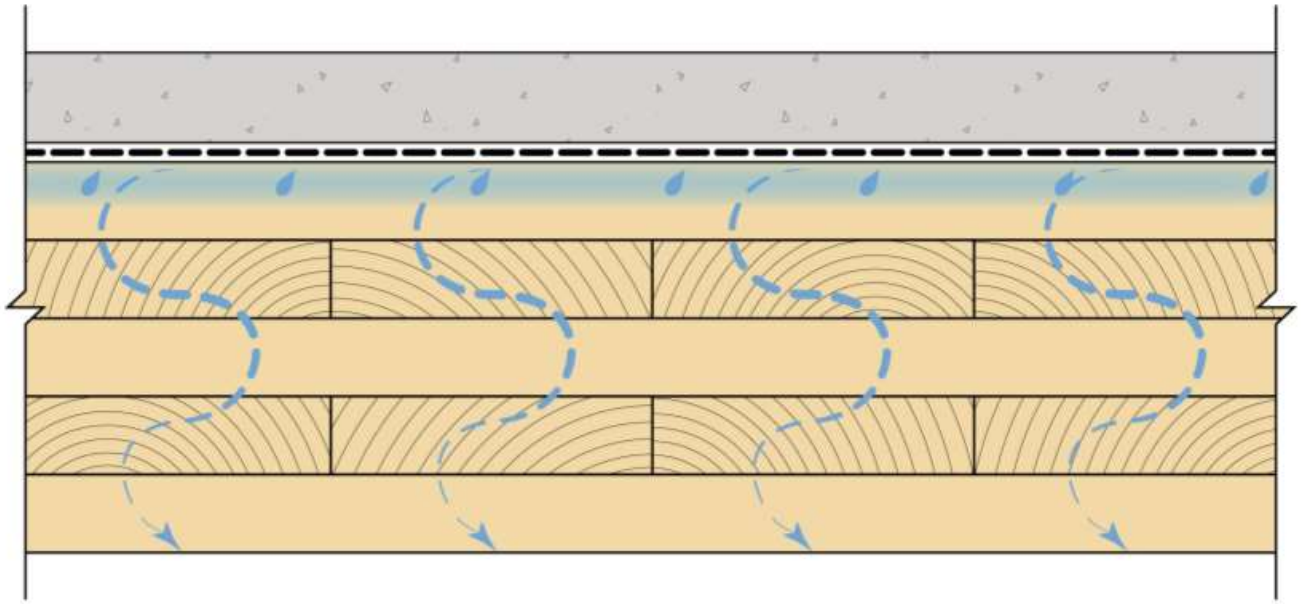


Mass Timber and Moisture: CLT



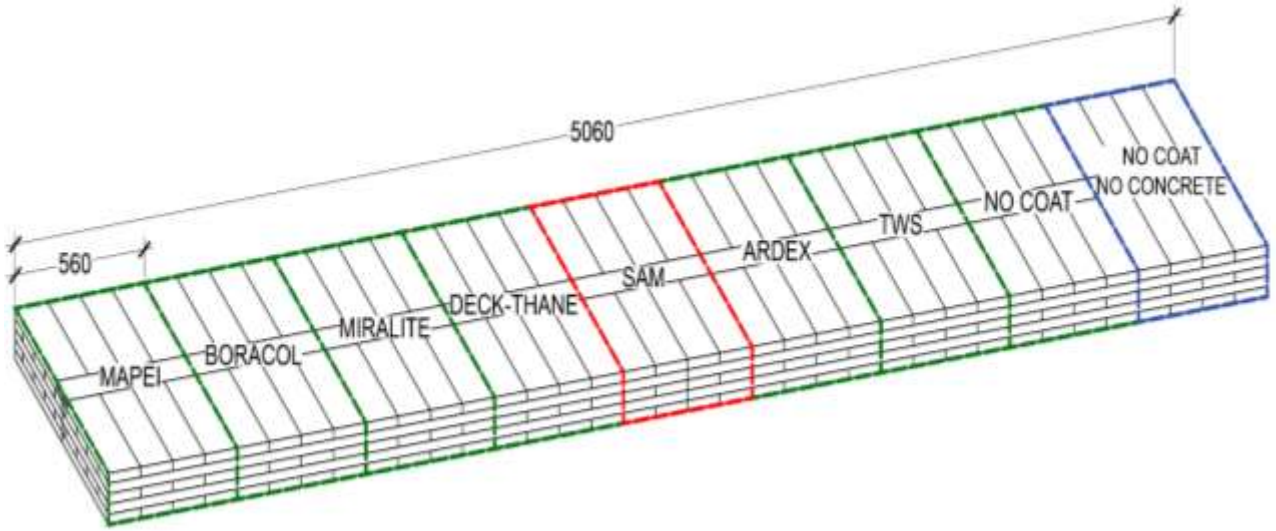


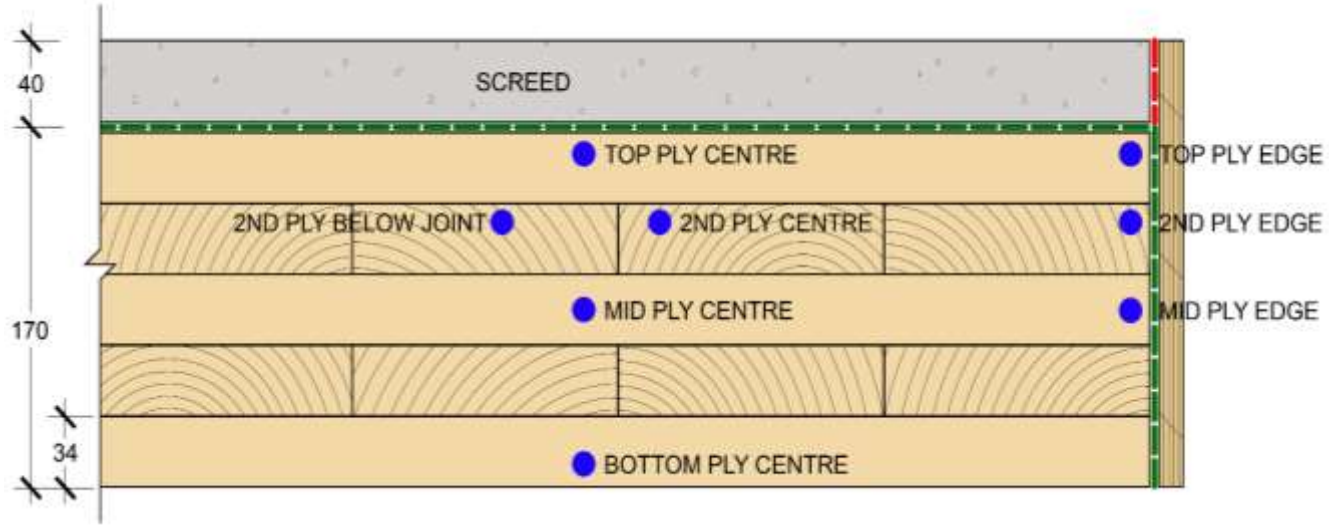


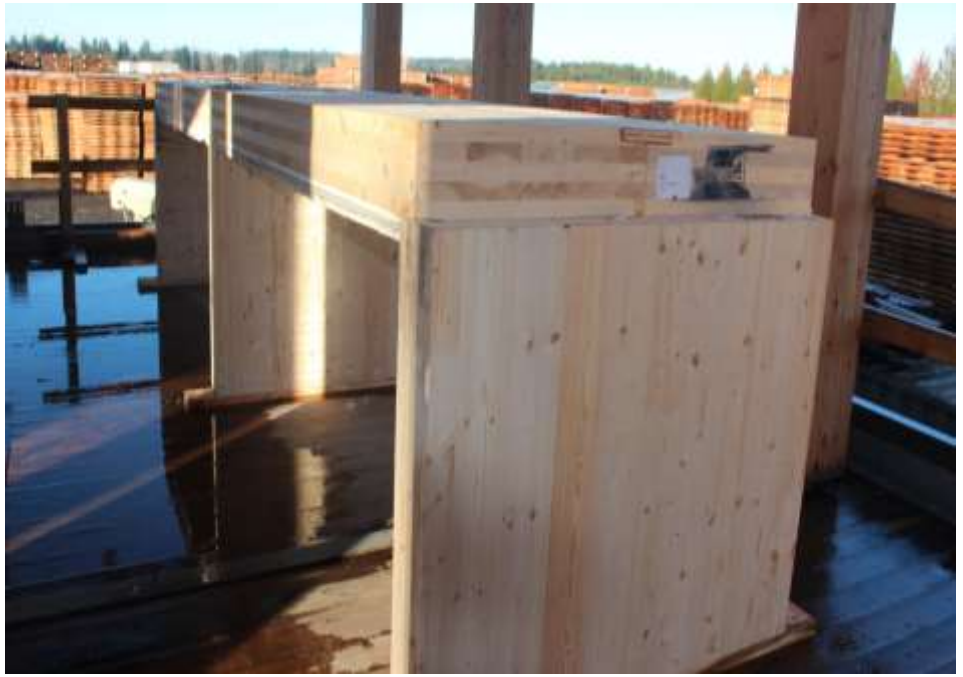


wet concrete on wet wood?

Lots of Research



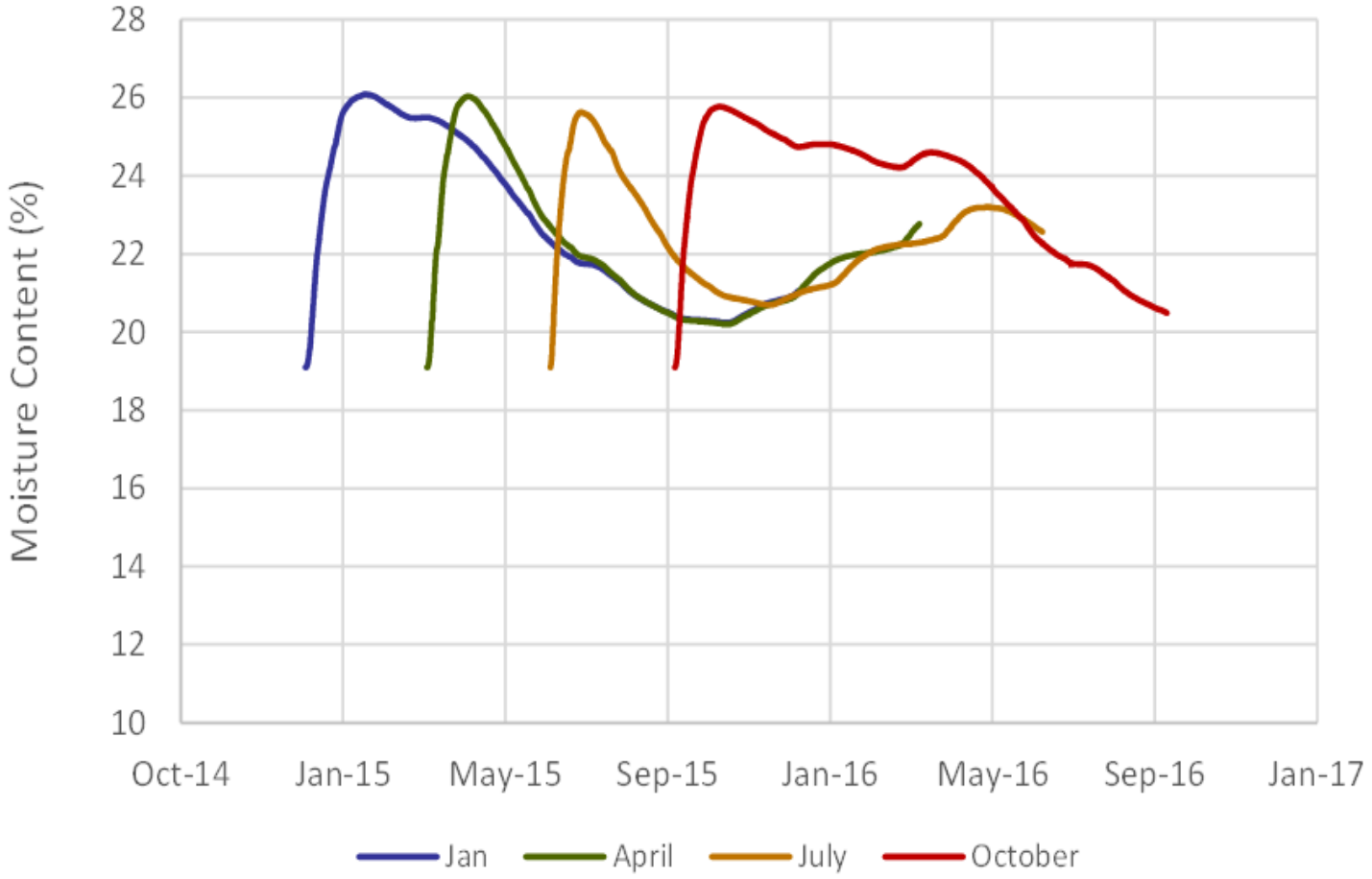




COATING SUMMARY

PRODUCT	DESCRIPTION	APPLICATION / CURE TIME	CLT SAMPLE PHOTO
Boracol 20-2BD	Alkaline salt & fungicide wood surface treatment	Brush, sprayer Multi-day	
Thompson's WaterSeal (TWS) Waterproofing Wood Protector	Aliphatic hydrocarbon solvent & paraffin oil wood coating (hydrophobic)	Brush, roller, sprayer, pad 48 hours	
Miralite Side Sealer	Alkyd urethane temporary wood protectant (hydrophilic)	Brush, roller, airless spray, sprayer Touch dry 15 minutes, full dry 1 hour	
Mapei Primer L	Acrylic latex primer for concrete	Mix 1:3 with water, pour applied and brushed in 3 hours, maximum open time 18 hours	
Deck-Thane Primer	Moisture cured polyurethane primer for concrete & wood (hydrophilic)	Brush, roller, sprayer Touch dry 2 hours, full cure 2-8 hours, maximum open time 8 hours	
Ardex P 51 Primer	Acrylic/vinyl based concrete, wood, and gypsum primer	Mix 1:1 with water, bristle broom applied Minimum 3 hours, maximum 24 hours	
Protectowrap PW 100/40	Cold-applied polyethylene faced & butyl hybrid adhesive self-adhered membrane (impermeable)	Peel and stick, rolled in place Immediate	

Drying Rates vs. Regional EMC



Data EMC % By Month:

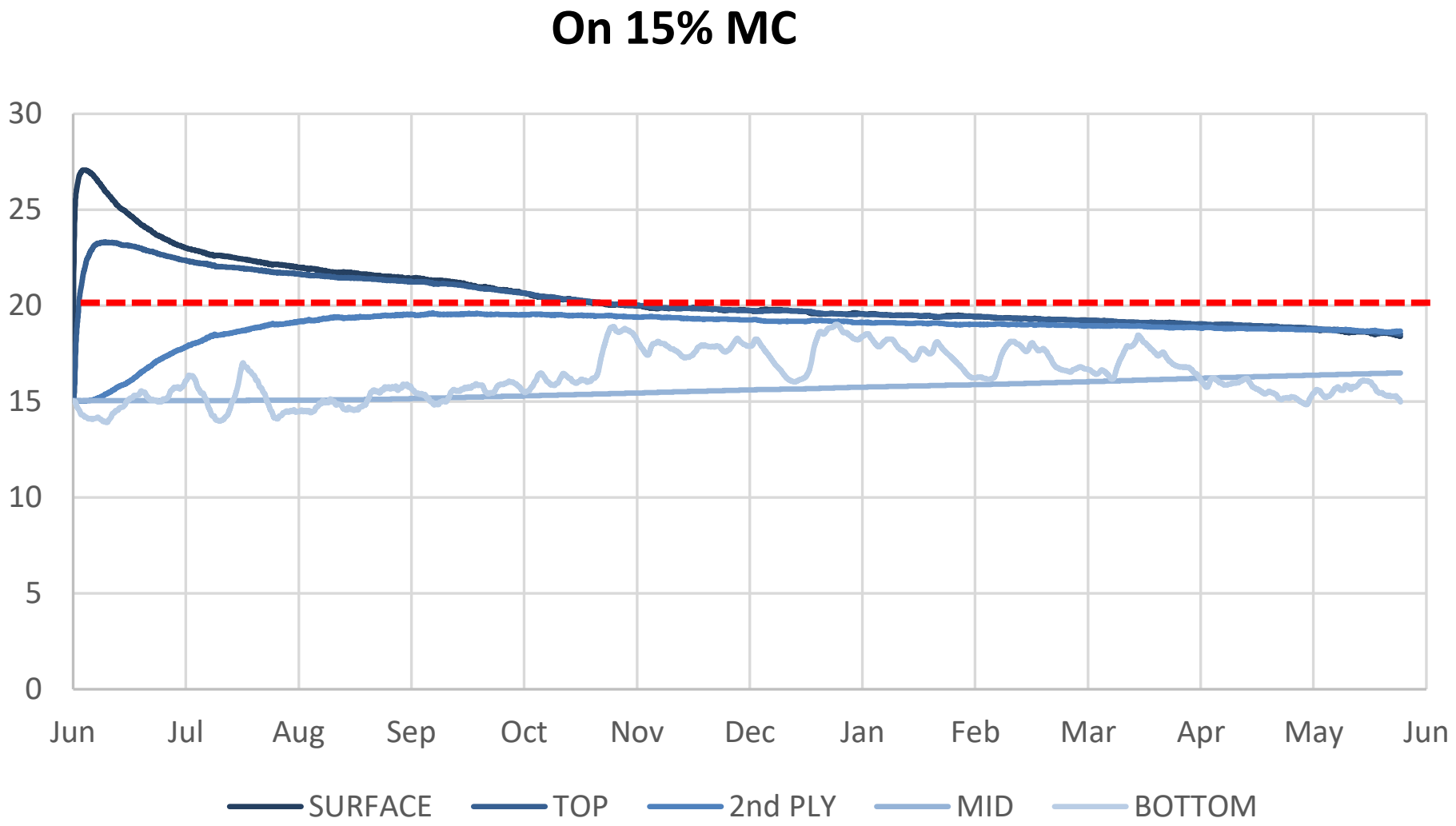
January: 17.6%
April: 14.7%
July: 13.8%
October: 18.0%

Regional Comparisons (July):

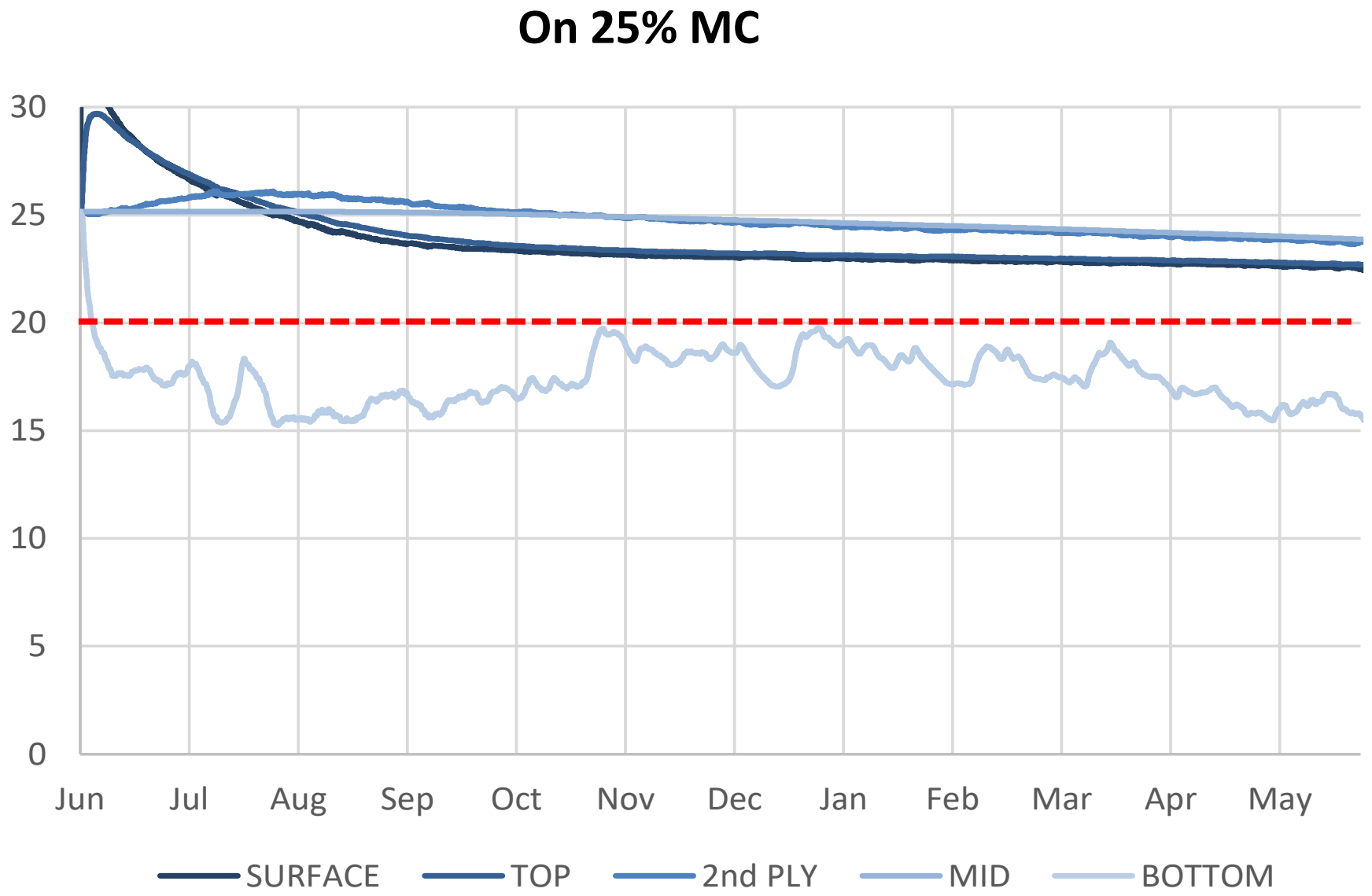
San Francisco: 13.9%
Atlanta: 13.8%
Boston: 11.8%
Denver: 9.4%
Chicago: 12.8%
Pittsburgh: 12.6%
Phoenix: 6.2%

Figure 10 – Impacts of Rate of Drying Times on Time of Installation of Concrete Topping

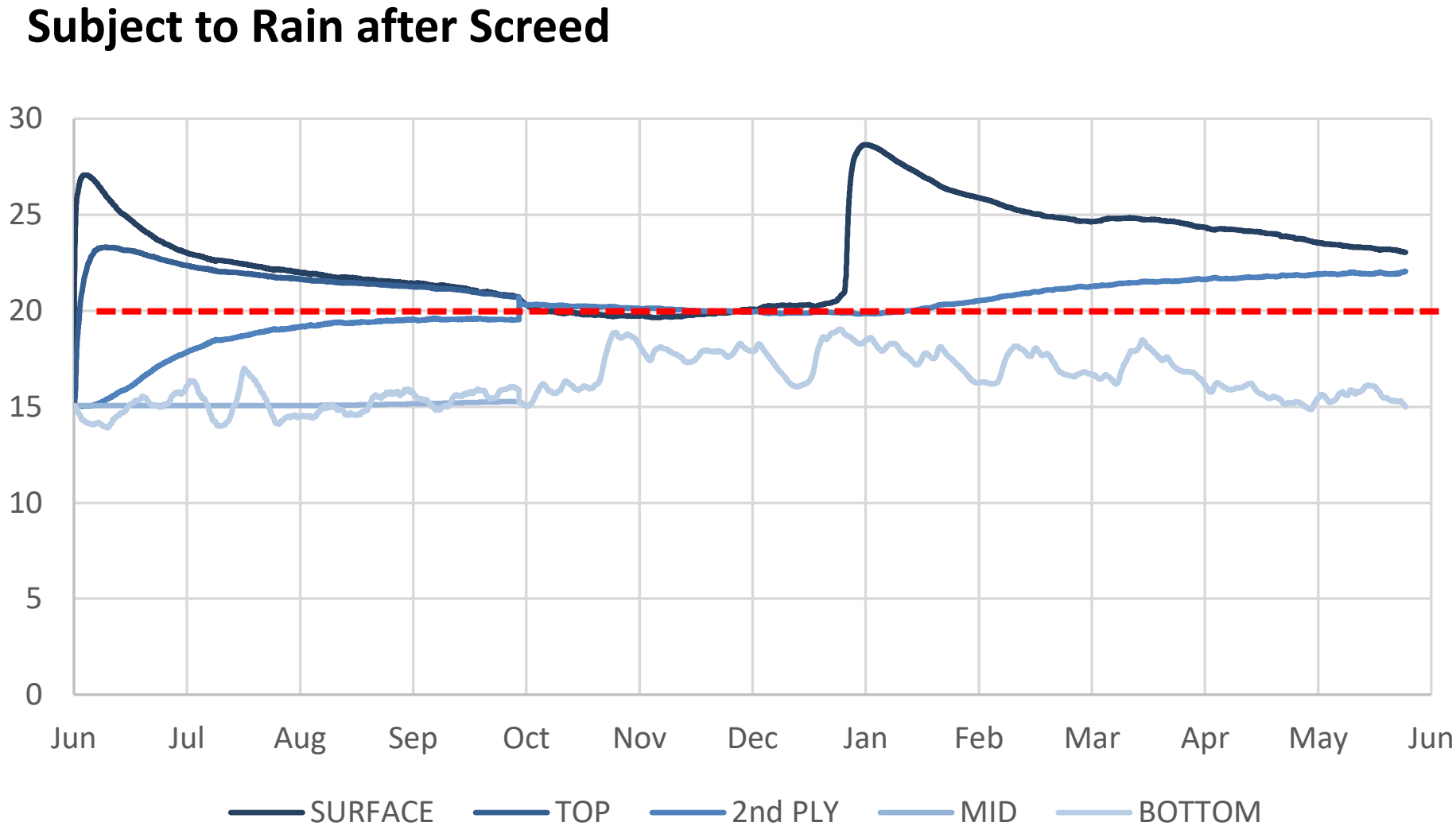
Summer Screed Application



Summer Screed Application



Wetting after Topping Application?




Can we pour topping slab?

Managing Risk

Degrees of protection

Degrees of protection

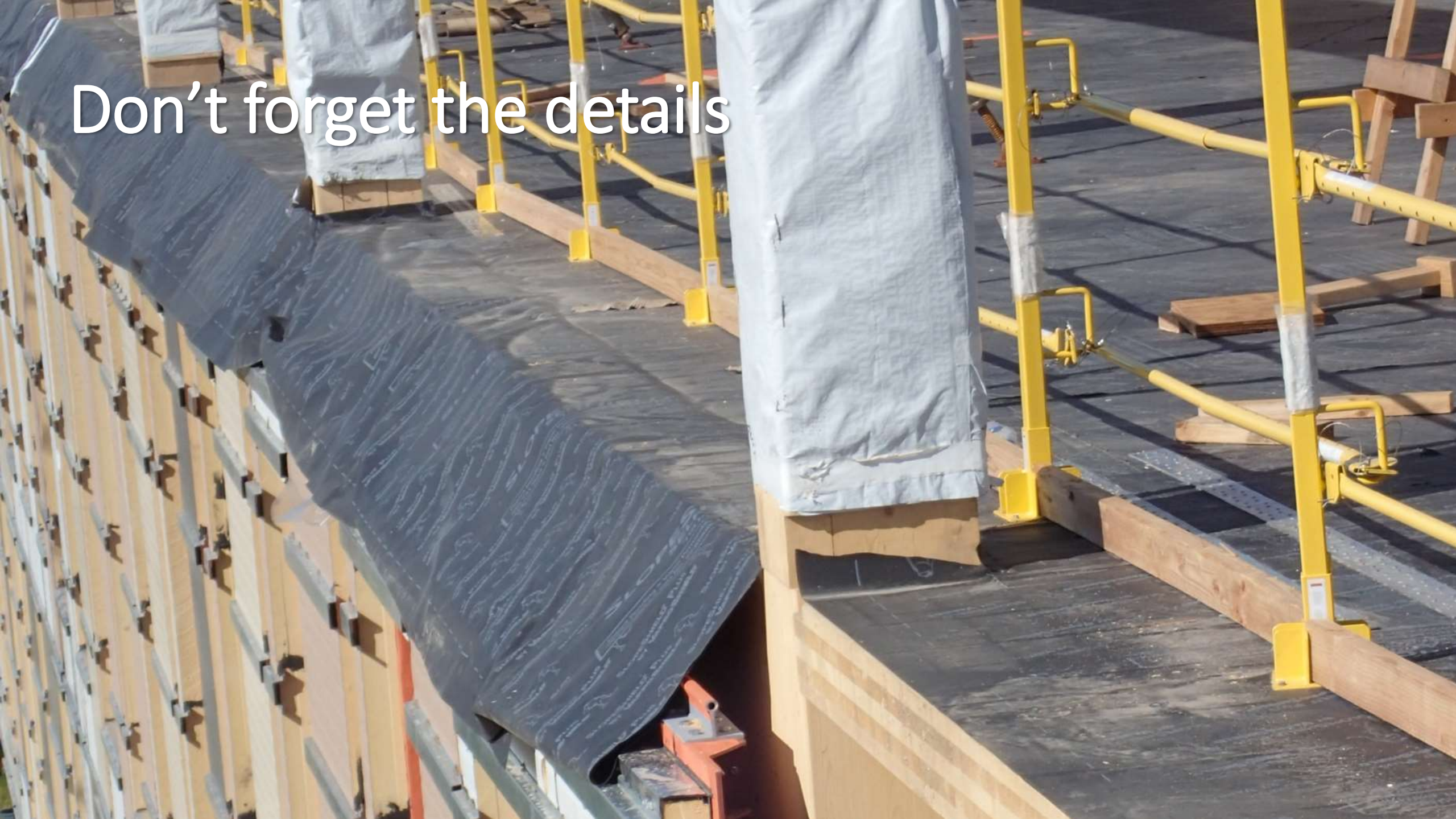
CLT factory coatings

Degrees of protection

Degrees of protection

Degrees of protection

Factory-applied roof membranes


Don’t forget the details


Brooms and kiddy pools

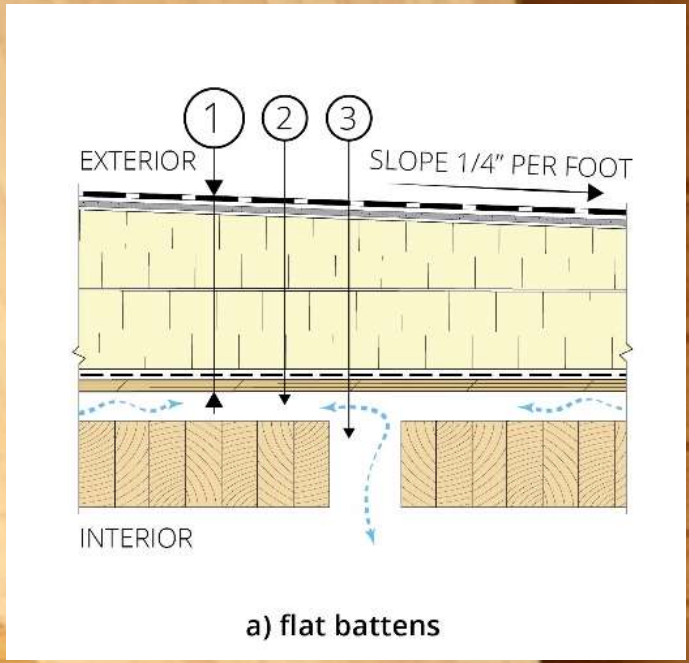
risk management tools

late risk management tools

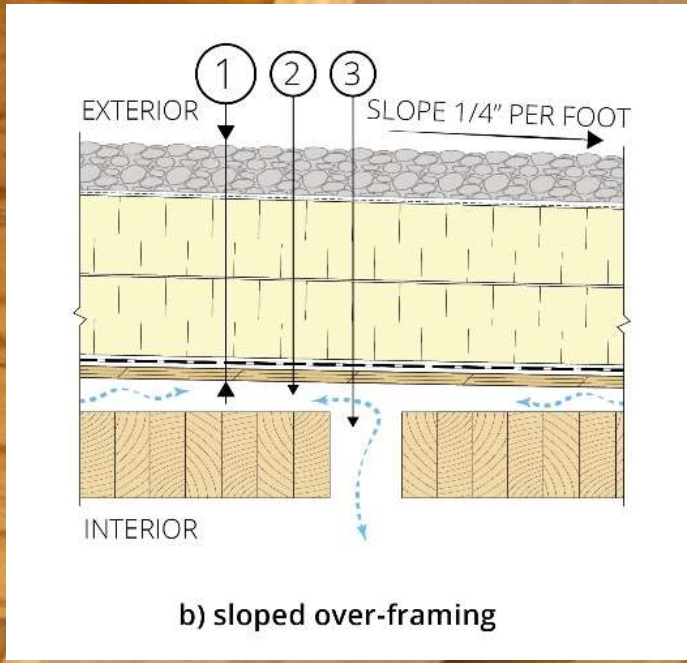
Façade speed matters


Time-sensitive site installation

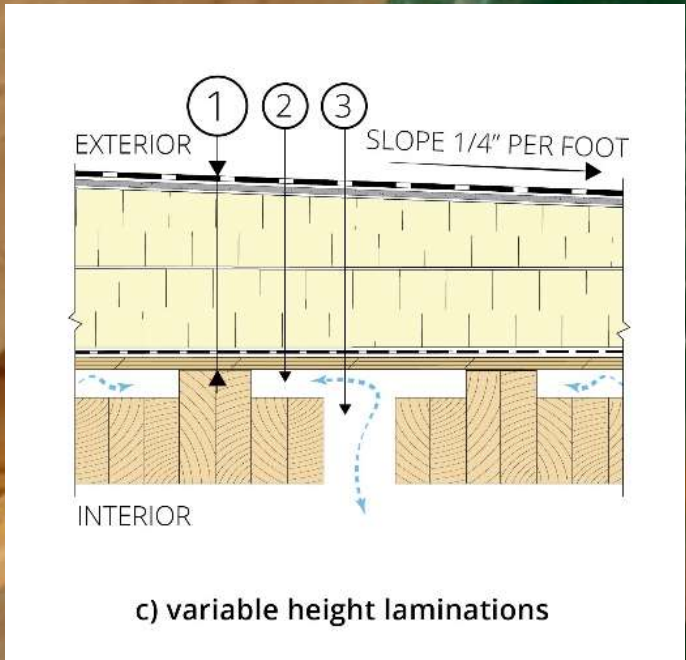
Ventilated decks



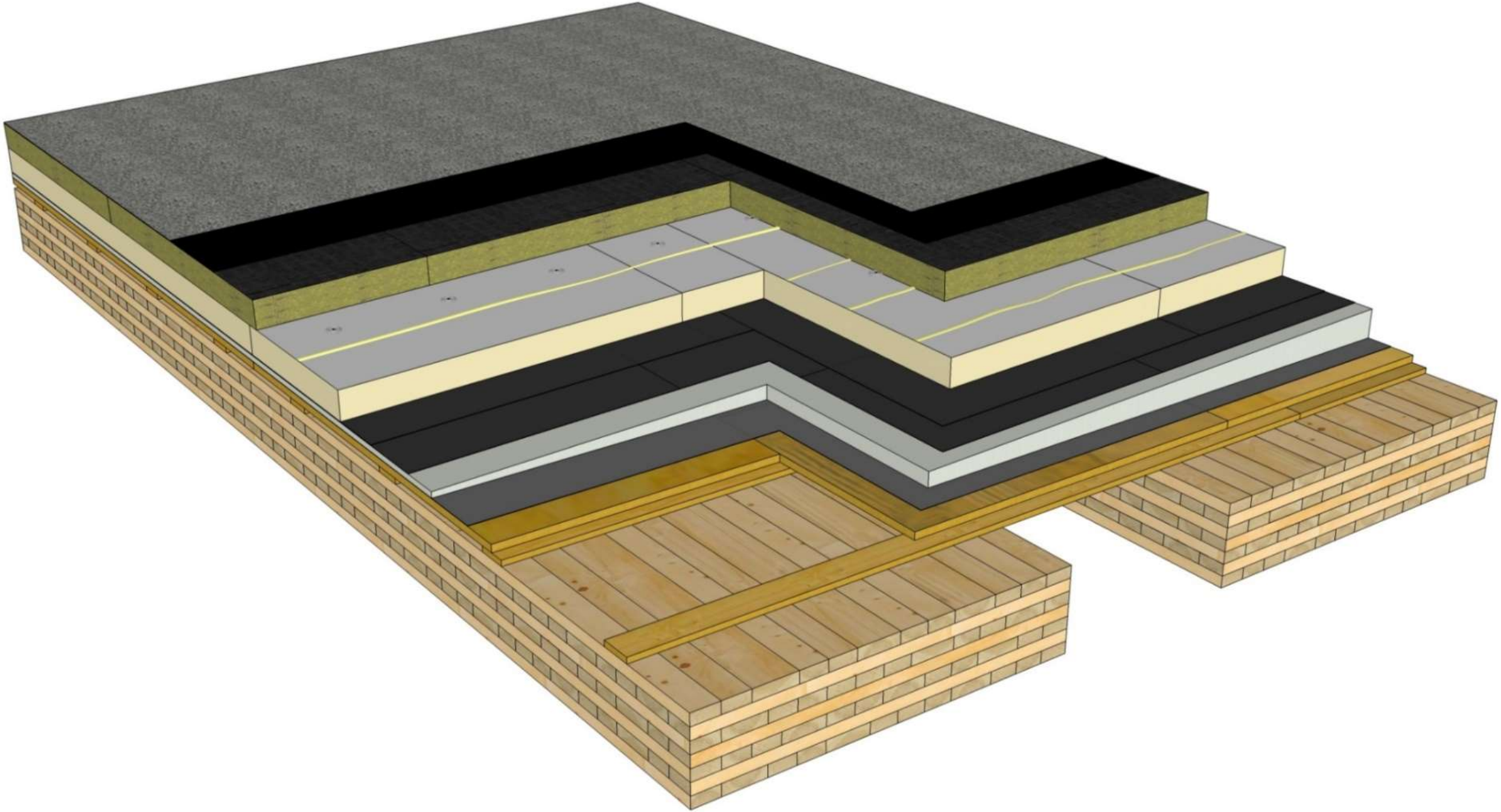
a) flat battens

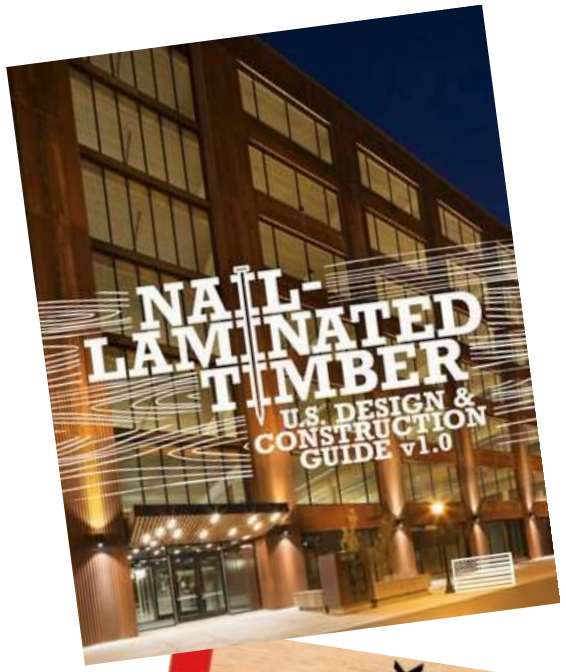


b) sloped over-framing



c) variable height laminations





PROTECTION LEVEL	TMMS MEMBRANE / JOINT TREATMENT	BENEFITS	CHALLENGES / LIMITATIONS	RECOMMENDED CLIMATE INDEX / SEASON
 HIGH	**Field Membrane:** Fully adhered, vapor-impermeable waterproof membrane on sheathing. **Joint Treatment:** Fully adhered or welded field membrane laps.	Factory applied field membrane prior to shipping minimizes errors and weather limitations of on-site application. Field membrane may serve as part of permanent roof membrane or flooring underlay. Allows for immediate installation of joint treatment following panel installation (if skilled workers are available). High durability of membrane laps where torched or welded (avoid self-adhered laps).	Requires pre-coordination with subcontractor installing TMMS. Can trap moisture within the NLT assembly and significantly reduce drying should water penetrate the membrane	All Climate Indices / All Seasons
 MODERATE	**Field Membrane:** Precoated, moisture-resistant bonded water-repellent coating on sheathing. **Joint Treatment:** Taped and/or sealed (e.g. flexible flashing membrane or tape).	Precoated sheathing minimizes need for experienced membrane installers. Sheathing and TMMS field membrane are combined into a single fabrication step. Allows immediate installation of joint treatment following panel installation.	Sheathing attachment penetrates through TMMS field membrane; taped/seal over fasteners. May be susceptible to damage and/or adhesion failure due to trade activities. May have limited exposure time; ponding water may result in water absorption and slow drying.	Climate Index ≤ 70 / All Seasons
 MODERATE	**Field Membrane:** Fully adhered, vapor-permeable and moisture-resistant membrane on sheathing. **Joint Treatment:** Taped and/or sealed (e.g. flexible flashing membrane or tape).	Factory applied field membrane prior to shipping minimizes errors and weather limitations of on-site application. Allows for immediate installation of joint treatment following panel installation if field membrane is pre-applied to sheathing.	Requires pre-coordination with subcontractor installing TMMS. TMMS may be susceptible to damage and/or adhesion failure due to trade activities. May require skilled/experienced installer.	Climate Index ≤ 70 / All Seasons
 MODERATE	**Field Membrane:** None. Exposed plywood or OSB sheathing. **Joint Treatment:** Taped and/or sealed (e.g. flexible flashing membrane or tape).	Allows for immediate installation of joint treatment following panel installation. Skilled/experienced workers not required for joint treatment installation. Additional applications of water sealer may further increase water resistivity of the sheathing. Cost effective compared to options with field membrane.	Some joint treatment products may not bond to damp or wet sheathing substrate. Joint treatment may be susceptible to damage and/or adhesion failure due to trade activities.	Climate Index ≤ 35 / All Season Climate Index ≤ 70 / Dry Seasons
 LOW	**Field Membrane:** None. Exposed plywood or OSB sheathing **Joint Treatment:** None. Exposed sheathing joints.	Cost effective. May minimize schedule impacts.	System permits water migration between sheathing joints and into the NLT in wet weather conditions.	Climate Index ≤ 35 / All Season
 LOW	**Field Membrane:** None. Exposed NLT laminations. **Joint Treatment:** Not applicable.	Accommodates sheathing installation at a later date or following site installation of overframing. May minimize schedule impacts. Cost effective.	Option permits water migration between NLT in wet weather conditions.	Climate Index ≤ 35 / All Season
 ISOLATED AREAS ONLY	**Field Membrane:** Loose laid sheet over sheathing. **Joint Treatment:** Taped and/or sealed (e.g. flexible flashing membrane or tape).	Serves as short-term temporary protection for isolated areas.	Low durability. Difficult to seal. Typically slippery and dangerous to walk on. Allows lateral moisture movement beneath membrane.	Isolated Conditions (evaluate for project specific appropriateness)
 ISOLATED AREAS ONLY	**Field Membrane:** Membrane under sheathing and over NLT laminations. **Joint Treatment:** Varies.	Sheathing protects membrane from trade damage.	TMMS is [illegible] for [illegible]	[illegible]

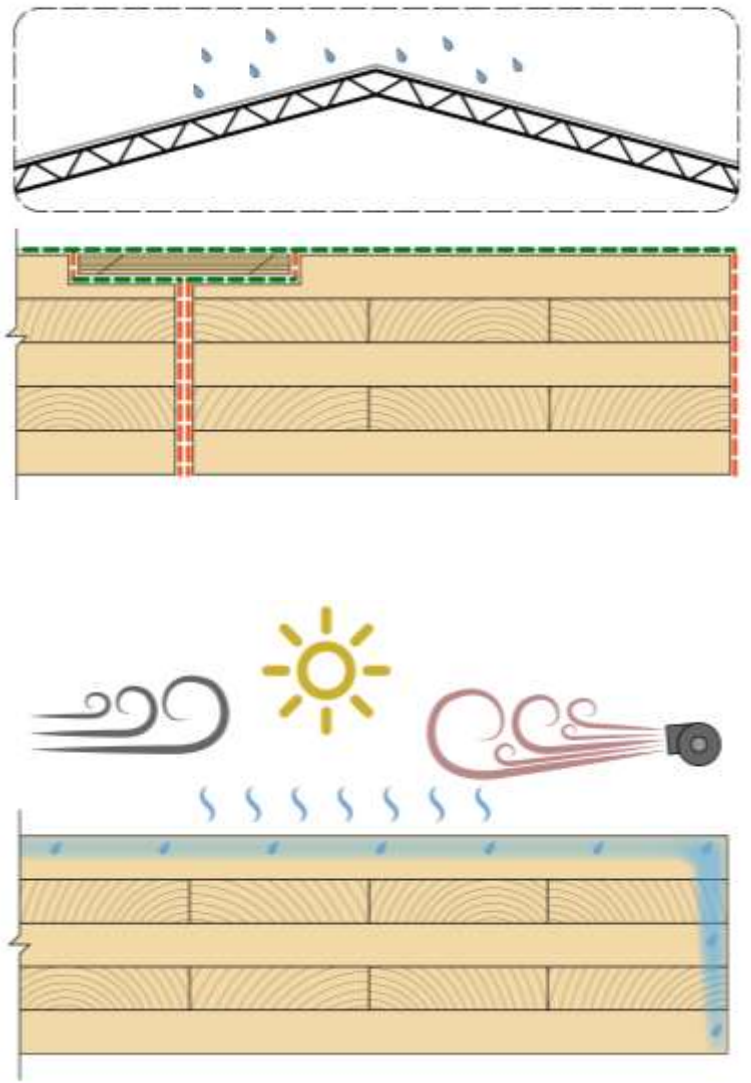
guidance

How-to: Manage Moisture Risk

- Start planning early – design and assembly choices
  - Impact to architecture, structure, building enclosure, fire separation and acoustics
  - Consider multi-function materials (i.e. temporary roof later becomes functioning air barrier/vapor barrier or floor acoustic underlayment)
  - Consider schedule impacts of wet wood during construction (i.e. design away the delay?)
- Include requirement in specifications for general contractor and mass timber sub-contractor to provide & follow written a **Moisture Management Plan**
  - Responsibility of contractor or sub-trade
  - Plan for regular reviews of implementation by (3rd party and/or BE Consultant, Architect, Structural Engineer)
  - Ask for mock-ups

How-to: Moisture Managem

- ✓ Step 1: Risk Evaluation - consider climate, rainfall, construction schedule, length of exposure of all mass timber floors/roof/walls, type of mass timber
- ✓ Step 2: Factory applied coatings to exposed surfaces/edges/cores (CLT)
- ✓ Step 3: Pre-applied or field applied temporary or permanent membrane protection?
- ✓ Step 4: Active water management team onsite to reduce uptake (small tarps, squeegees/vacuums etc.)
- ✓ Step 5: Whole building tarping & protection systems
- ✓ Step 6: Environmental drying
- ✓ Step 7: Mechanical drying contingency



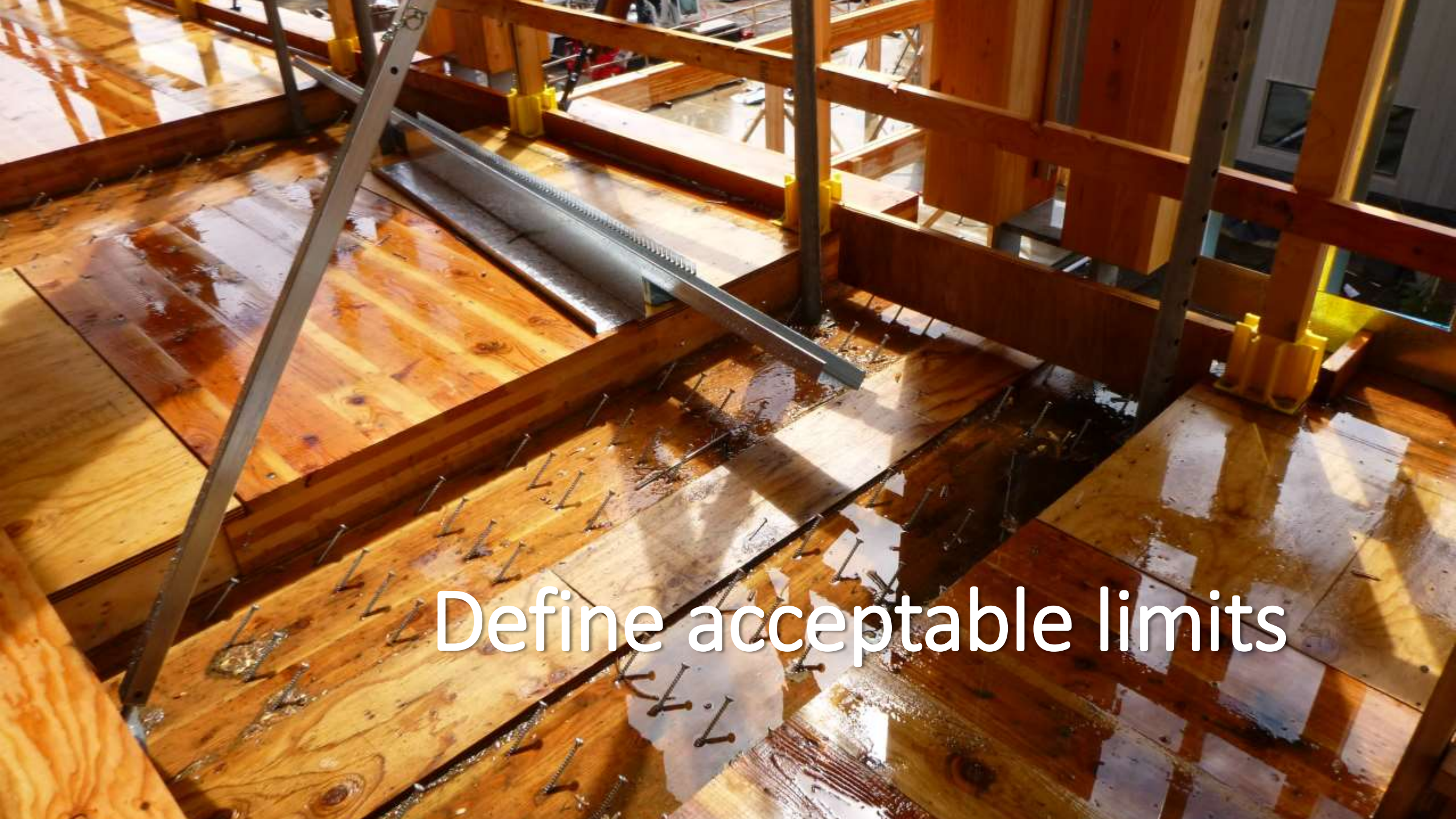
Construction Documents

Define acceptable limits


Acceptable?


Acceptable?

Acceptable?


Define acceptable limits

Division 01

SECTION 01 56 00
MOISTURE MANAGEMENT PLAN

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Moisture Management Plan for Mass Timber.

B. Coordinate Plan with the work of other related se

1.02 REFERENCE STANDARDS

A. If applicable, comply with requirements of the Authorities Having Jurisdiction over the location of the Project.

1.03 DEFINITIONS

A. Moisture Management Plan: A written plan for the temporary protection of specified materials from moisture during transportation, storage, and construction.

B. Moisture Control Measures: A method for the protection of a specified material from moisture, including but not limited to tenting, wrapping, application of temporary or permanent water-resistant coatings or membranes, use of just-in-time delivery methods or adaptive scheduling and sequencing of the work, and active measures to remove accumulated moisture in a timely fashion.

C. Moisture: Humidity, condensation, precipitation, ground water, snow, snow-melt, ice, frost or water from other sources with which a specified material may come into contact.

1.04 SUBMITTALS

A. Develop and submit complete Moisture Management Plan prior to product shipment or prior to any Work, whichever occurs sooner.
   1. Submit to Architect for Owners review and approval.

B. Contact Information:
   1. Provide contact details for a representative of the Contractor who will be responsible for the Moisture Management Plan and its implementation.

From CD Phase Requirements -> Submittal from Contractor

Common Moisture Management Planning Documents

The documents listed below are commonly included in a moisture management plan package that is submitted to the design team prior to construction. Documents 2 through 7 are not included within this guide for this case study; however, a short description of each is provided.

1) **Written Plan Outlining All Phases:** See the above case study plan.
2) **Mass Timber Delivery Acceptance Checklist:** This document will include the minimum number of moisture content readings to be taken at delivery acceptance and will include who to contact if the mass timber does not meet the moisture content limits established by the project team.
3) **Site Plan:** This document will include a site plan of the project site and document the designated material storage area(s). The plan will also provide other relevant information, such as the location of the on-site moisture meter.
4) **Moisture Management Details Package:** This document includes sketches or redlined details that identify the moisture protection methods to be used at common building details and panel joints and edges.
5) **Drainage Plan:** This plan identifies the appropriate drainage paths for controlling site water. This plan will include where to direct water off roof edges, at piped drains, etc. for all floors and the roof. Drainage plan may vary by stage of construction (e.g., water may no longer be directed over the edge of the roof or over exterior walls if parapet installation is complete).
6) **Weekly Checklists:** Checklists will include items monitored or performed at regular intervals, such as ongoing moisture management. Checklists may include the following: monitor the weather forecast, review the underside of mass timber panels for leaks, review membranes for damage, etc.
7) **Pre- and Post-Pour Checklists:** These checklists will confirm when moisture content readings are taken and may outline required sequencing requirements prior to pouring concrete. Post-pour protection methods are also included.

Submittal Example

GENERAL CONSIDERATIONS

- Moisture management strategies and the importance of early leak detection and membrane upkeep will be included in onboarding site orientation for new workers.
- Checklists will be completed every Monday to ensure ongoing moisture management (see the included **Weekly Checklist**).
- The protection installed is a low robustness membrane. In a wetting event, immediate action will be taken to reduce the risk of permanent damage. Water will be squeegeed off the flooring surface to designated areas along the face of the building where water is to be pushed off the deck surface (see the included **Floor Drainage Plan** with the marked location where water is to be removed).

Contingency for weather:

- ☑ In the case of an extreme weather event, general laborers on-site from Monday to Friday will assist with water management of the floor CLT panels.
- ☑ On weekends, the lead contractor will monitor the weather. In the case of extreme weather on a weekend, an on-call team will be called to remove water atop CLT floor panels.
- ☑ If required, electric heaters and fans will be used to mechanically dry the mass timber.

CLT ROOF PANEL (WITH VIMP SA ROOFING MEMBRANE)

- Protection installed is a high robustness membrane. In a wetting event, no immediate action is required and there is a low risk of moisture damage.
- Water will be removed in accordance with the drainage plan as necessary to carry out work in the area (see the included **Roof Drainage Plan** with the marked location where water is to be removed). Water will be removed by squeegeeing to the designated area. Once parapet walls are installed, water will be removed using portable pumps and directed to the designated areas.

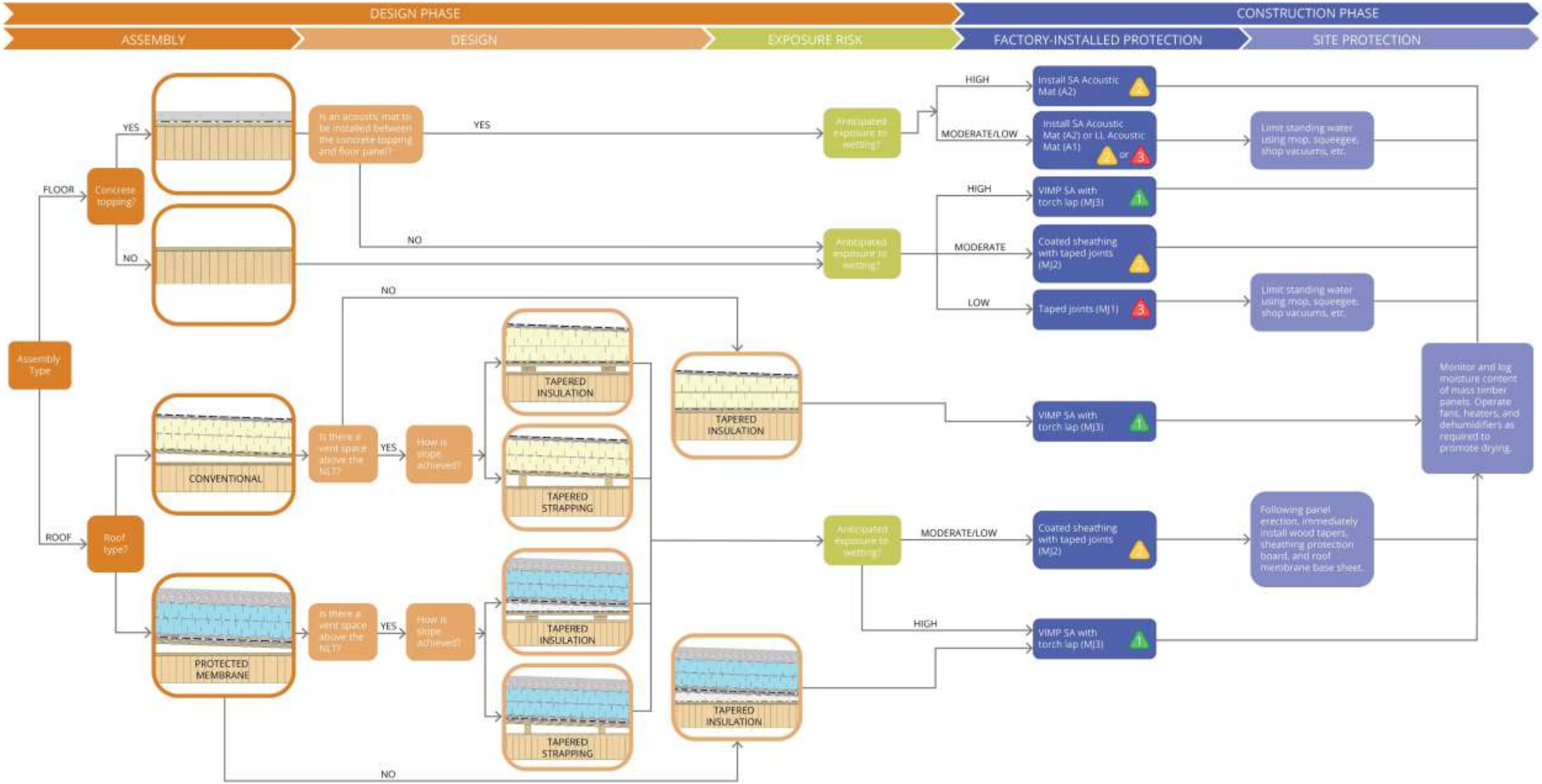
Contingency for weather:

- ☑ Excessive standing water will be removed from panel areas in accordance with the drainage plan.

CONCRETE TOPPING INSTALLATION

- Concrete floor topping placement will be completed after enclosure walls are installed. Prior to placement, a sampling of moisture readings will be taken to confirm the panels are dry (see included **CLT Pre-Pour Checklist**).
- If required, electric heaters and fans will be used to mechanically dry the mass timber.

Figure 13 *Moisture Management Planning Tool for NLT and DLT roof and floor assemblies.*



Protection Type	Protection Name	Description	Example Product	Risk Level
Coat	Edge Coat	High build paraffin edge protection sealer	Broda Check Stop or similar	ALL
	Top Coat	Hydrophobic wood sealer	Sansin KP-11 or similar	3
Membranes (CLT & MPP)	Membrane 1 (M1)	Vapor-permeable self-adhered (VP SA) membrane	VaproShield SlopeShield Plus with sealed laps or similar	2
	Membrane 2 (M2)	Vapor-impermeable self-adhered (VIMP SA) membrane	Textured or sanded impermeable peel and stick with sealed laps	2
	Membrane 3 (M3)	Vapor-impermeable self-adhered SBS membrane with torched laps (VIMP SA Torch Lap)	Soprema Elastophene Flam Stick with sealed laps or similar	1
Membranes & Joint Protection (NLT & DLT)	Membrane and Joint 1 (MJ1)	Membrane: None, sheathing is exposed Joint treatment: Taped and/or sealed	SIGA Wigluv, Rothoblaas Frost Band, ZIP flashing tape, or similar	3
	Membrane and Joint 2 (MJ2)	Membrane: Precoated, moisture-resistant bonded water-repellent sheathing Joint treatment: Taped and/or sealed	ZIP sheathing, ZIP flashing tape	2
	Membrane and Joint 3 (MJ3)	Membrane: Vapor-impermeable self-adhered (VIMP SA) SBS Joint treatment: Fully adhered or welded membrane (torched laps)	Soprema Elastophene Flam Stick with sealed laps or similar	1
Acoustic Mat	Acoustic Mat 1 (A1)	Acoustic loose-laid (LL) vapor-impermeable mat	Per acoustic design with sealed laps	3
	Acoustic Mat 2 (A2)	Acoustic self-adhered (SA) vapor-impermeable mat	Per acoustic design with sealed laps	2

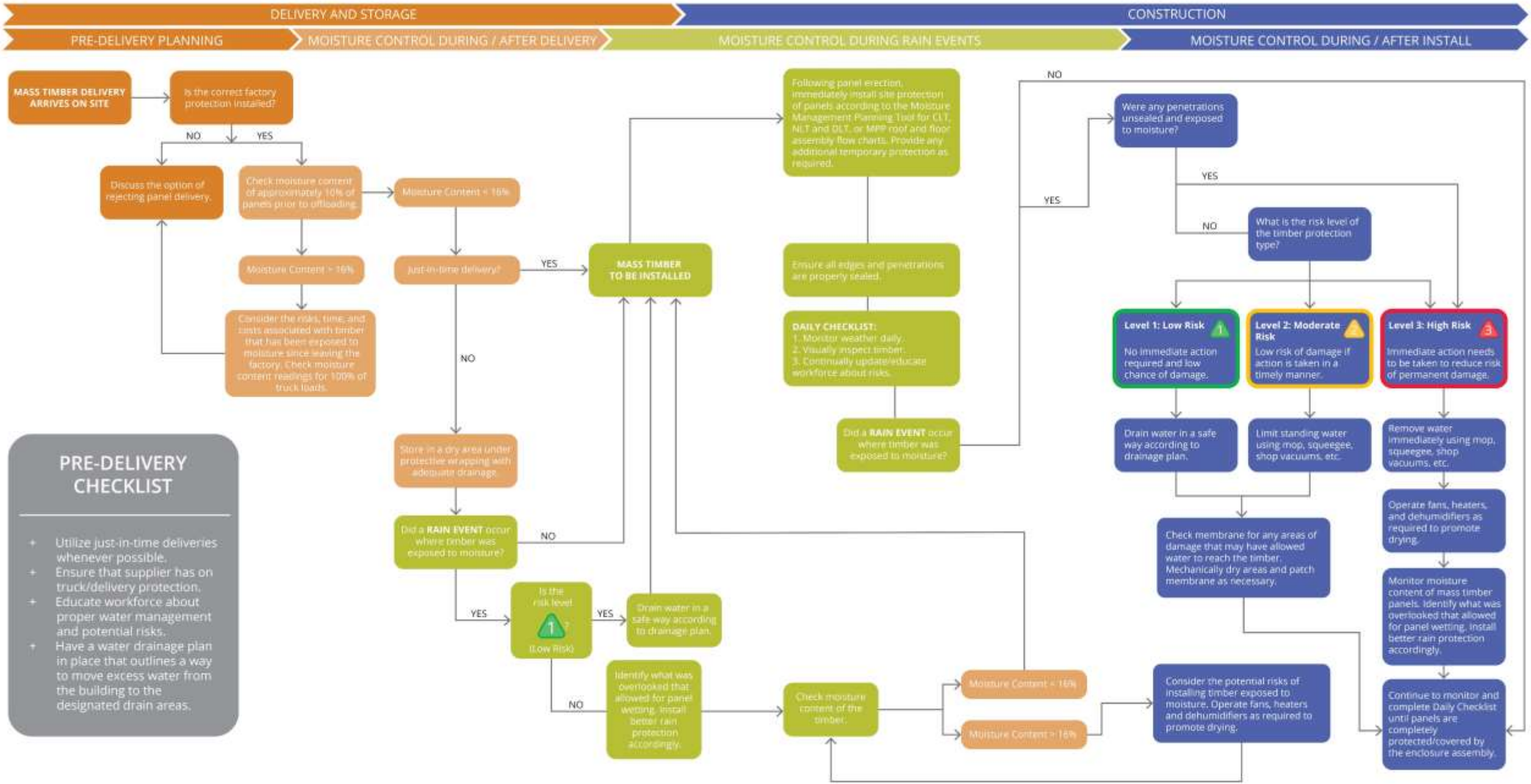
Legend

Risk Level 1: Low Risk
No immediate action required and low chance of damage

Risk Level 2: Moderate Risk
Low risk of damage if action is taken in a timely matter

Risk Level 3: High Risk
Immediate action needs to be taken to avoid the risk of permanent damage

Figure 16 *Contractor's Moisture Management Tool: mass timber management from pre-delivery to project completion.*



Key Points: Moisture Management for Mass Timber

1. Plan During Design
2. Perform a Risk Evaluation
3. Develop a Construction Phase Moisture Plan & Get Buy In
4. Execute the Design & Moisture Management Plan
5. Monitor the Plan

QUESTIONS?

This concludes The American Institute of Architects Continuing Education Systems Course

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RDH Building Science

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