Design: Tips for Durable Wood Building Envelopes

Key Point	Don't, for example:	Do:
Kiln dried wood, glulam, LVL, LSL, plywood and OSB are too dry to decay or support substantial mould growth at time of manufacturing.	Store wood materials exposed to rain or on soil.	Protect wood from rain and soil during transport and storage.
	Ignore opportunities for prefabrication.	Prefabricate systems as much as possible under dry conditions
	Expose wood systems to rain for extended periods.	Install water-resistant barriers on walls and roofs ASAP.
	Enclose wet wood into building assemblies	Allow time or use supplementary heating to dry out wet wood.
Wood expands as it absorbs moisture and contracts as it dries. The expansion/shrinkage mainly occurs in the cross sections, and is negligible in the longitudinal direction.	Design balconies and roof decks without considering building movement.	Design slopes taking into account shrinkage, compression , other movement and drainage requirements.
	Design interfaces at cladding without considering building movement.	Design so windows, interfaces, penetrations and flashing accommodate movement.
	Design air barriers without considering building movement.	Design so the continuity of the air barrier will not be compromised by movement
	Rely entirely on caulking as a water shedding surface.	Design so caulking is not the critical element of the water management system.
Wind-driven rain is a major source of moisture.	Expose walls unnecessarily.	Use pitched roofs and overhangs
	Use face sealed walls in high exposure situations.	Use pressure moderated rainscreen wall systems where appropriate.
	Expect components under overhangs to always stay dry.	Design to accommodate diagonal rainfall.
	Expose penetrations in walls	Detail penetrations to shed water
Wind-driven snow is a major source of moisture.	Create points where wind can funnel snow into the building.	Detail to exclude snow.
Ground water is a major source of moisture. Water entering basements and parkades can also evaporate and move as vapour into the building.	Expect equal water pressure on all sides of basements.	Put extra effort into diversion and drainage on the uphill side of a building.
	Put untreated wood in direct contact with concrete below 150mm above finished soil level.	Separate wood from concrete with a space or membrane or use treated wood in concrete where moisture may wick through.
Air leakage and condensation is a major source of moisture.	Expect wall systems to resist air leakage without careful design and construction.	Minimize air leakage through good detailing.
Vapour diffusion and condensation is a major source of moisture in colder climates.	Expect walls to resist vapour diffusion without careful design and construction.	Minimize vapour condensation in wall assemblies by placing vapour retarder on warm side of insulation.
Dryer vents are a major source of moisture.	Discharge dryer vents into enclosed spaces (e.g. soffits) or to inaccessible locations.	Discharge dryer vents in areas that can mix well with outside air and design for accessibility to unblock the vents.
Impermeable surfaces divert rain to other envelope components	Expect water to find its own way safely off the surface	Think like a raindrop and figure out where water will go
	Leave ends of flashing flat	Detail flashing with end dams
Water runs down hill	Funnel water into building	Slope surfaces away
	Interrupt the flow of water.	Install crickets around chimneys, posts on balconies etc.

	Slope penetrations to inside.	Slope penetrations to outside.
Impermeable building components may develop holes during transport and holes will be required for installation or as part of construction.	Expect windows to shed rain away from the wall	Detail openings to shed rain that penetrates the window frame.
	Expect membranes to keep out all water.	Detail for redundancy in moisture management.
	Design built-in planters or green roofs without well designed drainage systems	Install drainage to ground or stormwater for all built-in planters and green roofs.
Less water penetrates if liquid water does not stay in contact with the hole for long.	Discharge downpipes on flat roofs, balconies or walkways.	Conduct rain to ground.
	Put fasteners through horizontal membranes.	Avoid puncturing membranes. Fix railings to balcony fascia.
Wood takes up liquid water mainly through end grain and cracks in the top surface.	Expose tops of wood columns	Cap tops of wood columns
	Extend untreated wood beams beyond the roof line without protection.	Use flashing on top surface and ends with a ventilation space. Use surface and depot treatment.
Wood does not decay if it gets wet. It decays if it stays wet. Wood needs to dry to limit deterioration.	Put wood in situations where water will accumulate.	Position and detail to shed water and prevent water trapping.
	Put low permeance materials on both sides of wood components that may get wet unless it is durable wood.	Ensure the side of the wood system on which vapour is expected to exit has low permeance materials.
Wood dries faster if well ventilated.	Put wood in situations where ventilation does not occur.	Design so that there is adequate ventilation to facilitate drying.
	Seal tops of rainscreen cavities.	Provide flashed gap at top of cavities except under soffits or parapets due to wind-driven rain.
	Design unvented unheated walls	Design vents to facilitate drying of unheated walls.
Wood buildings are easily adapted for new uses and are often kept in use longer than concrete and steel buildings. Like all materials, wood needs regular maintenance and occasional repair.	Expect wood-frame buildings to be torn down in 30 years.	Design as though the building might last 200 years.
	Use less durable materials to support durable materials.	Use naturally durable or treated wood for structural components.
	Use short life material in places vulnerable to moisture behind long life material.	Use naturally durable or treated wood within clad unvented columns and parapets.
	Design walls inaccessible by ladder or cherry picker.	Design walls, attachments and landscaping for access.
Minimizing moisture ingress and accumulation will reduce but not eliminate termite attack.	Rely only on the building code for termite management in termite zones.	Use the 6Ss: Suppression, Site management, Soil barrier, Slab/ foundation, Structure durability, Surveillance + Remediation

Note: For more detailed information, visit www.durable-wood.com
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WoodWORKS! Project of the Canadian Wood Council http://wood-works.org/

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