

Moisture Protection for Wood-Framed Balconies, Decks, and Elevated Walkways

Elevated exterior building elements such as balconies, decks, and walkways are popular features for buildings and need special attention during design and construction, and throughout the life of the structure. A search on the Internet will display numerous articles that illustrate how these elements can be framed with wood and be economical, safe, and durable. One key to achieving these goals is to anticipate and mitigate factors that may prevent success. For example, most wood framed exterior balconies, decks and elevated walkways are intended to be protected from exposure to moisture even though the finish surface may be exposed to weather. The wood framing is protected by a moisture barrier system and designed as a dry service condition. Wood framing kept dry is durable and can provide a long service life for the structure. However, inadequate detailing, improper construction, and poor building maintenance can allow moisture to breach the moisture barrier system and intrude into the intended dry space. This situation is further aggravated where details allow moisture to be trapped, creating an environment conducive to degradation of the structural components.

Beginning with the 2018 edition, the *International Building Code* (IBC) includes several provisions focused on design and protection of the structural framing for balconies, decks, and elevated walkways.

- Construction documents are required to include detailing for all elements of the impervious moisture barrier system when used to protect the structural framing and to include the barrier manufacturer's installation instructions (2018/2021/2024 IBC Section 107.2.5).
- Impervious moisture barrier systems protecting the structural framing are required to be inspected and approved prior to concealing (2018 IBC Section 110.3.6 and 2021/2024 IBC Section 110.3.7).
- Impervious moisture barrier systems protecting the structural wood framing are required to provide positive drainage for any moisture that penetrates the moisture permeable floor topping such as concrete (2018 IBC Section 2304.12.2.5 and 2021/2024 IBC Section 2304.12.3.4).
- Cross ventilation is required for enclosed spaces of exterior balconies and elevated walkways with weather-exposed surfaces. Openings shall provide a net free cross ventilation area of at least 1/150 of the area of each separate space (2018 IBC Section 2304.12.6 and 2021/2024 IBC Section 2304.12.2.5).

Local jurisdictions may have additional requirements such as periodic inspections or the use of preservative treated or naturally durable wood for framing members. Ultimately it is the responsibility of the project design professionals to provide adequate details and instructions to ensure a safe and durable structure. Eliminating moisture issues by examining the 4 D's; **D**eflection, **D**rainage, **D**rying, and using **D**urable material, is an effective way to obtain such a structure^[1]. Proper flashing, drip guards, and sufficient slope for drainage must be detailed. Provisions for allowing framing to dry if moisture penetrates the moisture barrier must be considered.

Nails, screws, or bolts for deck and rail attachments that penetrate moisture barrier systems allow moisture to find its way to the structural framing and should be avoided. Specifying preservative treated or naturally durable wood will provide additional protection for the framing. Furthermore, the specification should include instructions to protect wood framing from moisture during construction and ensure the moisture content of the wood members is at a dry service condition as defined by *National Design Specification® (NDS®) for Wood Construction* for the specific wood framing material, prior to enclosing. Additionally, building owners should be made aware of the importance of periodic inspection and proper maintenance to correct issues before they lead to serious problems. Detailing to enable periodic inspection after construction will assist this effort. Consultation with a building envelope engineering expert should be considered.

When the ability to maintain a dry service condition throughout the expected service life of the balcony, deck, or elevated walkway is in doubt, or when redundant protection is desired, a preservative treated or naturally durable wood product can be specified. Redundancy of protection is often a minor cost addition when looking at the long-term serviceability of the balcony, deck, or elevated walkway. Treated Parallam® Plus PSL (preservative treated Parallam® PSL) is a possible framing option in limited markets. Check with your local Weyerhaeuser representative for sizes and availability. Currently, no other Trus Joist® products is permitted to be preservative treated for these applications.

[1] *Designing for Durable Wood Construction: The 4Ds*, D.G. Hazleden and P.I. Morris, National Research Council Canada, 1999.

If you have any questions, please contact your Weyerhaeuser representative.