

## Engineered Wood in Coastal Environments

**Q:** I build custom homes in a harsh coastal environment, and I'm concerned about the durability of laminated veneer lumber (LVL), parallel-strand lumber (PSL), and glue-laminated beams in these houses. Often the buildings sit empty through a long winter season, and I'm worried that a leak that isn't immediately detected might damage big interior load-bearing beams and columns. Also, I'm curious to know what experience tells about treated-wood engineered beams for coastal conditions, whether in outdoor exposure or indoor situations.

**A:** *Architect and builder Andrew P. DiGiammo responds:* I used to have the same concerns you do, but after many years of using these materials in waterfront houses in Massachusetts and Rhode Island, I've laid those worries to rest.

When I first used these products 15 years ago, it was on a custom home in the dunes, with a three-story outdoor deck facing the Atlantic Ocean. I designed the building with a concrete pier foundation, using pressure-treated Parallams for first-floor girders and a floor frame of wood I-joists (both manufactured by Trus Joist Macmillan, now a part of Weyerhaeuser).

I had two concerns back then. My main worry was that some of the Parallam girders were going to be exposed forever under the floor, where they might be attacked by salt-laden moisture in the air (the kind of salt air that I have seen tear up the lockset on an entry door within a year). But I was also concerned about the exposure of all the other framing material in that house while it was under construction and before it was enclosed.

I also planned to support the entire three-story outdoor deck with pressure-treated Parallam posts. Those would be facing the weather directly, and I didn't know how they would hold up.

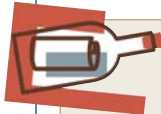
Now, 15 years later, I know the answer. All the Parallam beams under the house are still in fine shape, as are the Parallam posts holding up the outdoor deck — they look as good as they did the day we installed them. So I'm fully confident in treated Parallam members in any harsh coastal exposure. In fact, I have gained enough confidence that for the last house I built on elevated open piers, I specified Parallam beams without the pressure treatment. Knowing that they'll be sheltered under the house, not exposed to bulk water, I trust that they'll hold up well.



TED CUSHMAN



After 15 years in service, treated Parallam posts supporting a three-story beach house deck are as good as new (top). Treated Parallam girders supporting the main house's first-floor system likewise show no ill effects from weather or insects (bottom).



### Got a question?

We want to hear from you!

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As for the wood I-joists, none of the material I used in that house suffered damage from being exposed to weather during construction — nor has any of the wood I-joist material I've used in houses since then. As it happens, just the other day I went back to that house in the dunes to replace some roofing, and I noticed some pieces of the wood I-joists I used for framing, stacked under the house. (The owner had asked me to set aside some of that material for some reason or other, but he never used it.) After 15 seasons, those exposed and untreated I-joist scraps are now showing their age: the wood has turned gray and has rotted in places. The glued joints, however, have not yet let go. This conforms with all my other observations of this type of product — the material decays as a piece of lumber normally would, depending on the wood species it is made of, before it falls apart as an engineered piece of lumber.

My experience doesn't extend to pressure-treated LVL or glue-laminated timbers. I have, however, seen untreated LVL beams suffer from severe moisture conditions. My company recently rebuilt an old mill building in Fall River, Mass., that was built over a dirt crawlspace. Five years before we got there, someone had gone underneath and supported the floor with LVL girders. In that moist environment, those beams completely decayed and delaminated — just as badly as a piece of spruce would have. The lesson is that if it's not pressure treated, an LVL has no more moisture resistance than a piece of softwood lumber. So for severe moisture conditions, you want something treated.

In situations that call for moisture or weather resistance, I always reach for treated Parallams — and I can tell you that on my jobs, treated Parallams have been able to handle coastal moisture conditions just fine.

*Andrew P. DiGiammo is an architect and custom builder based in Assonet, Mass.*

## Engineered Wood and Preservative Treatments

To augment the lessons of design-builder Andrew DiGiammo's experience, Coastal Contractor called up Peter Laks, a professor in the School of Forestry and Wood Products at Michigan Technological University. Laks is an expert on wood preservative treatments and on the durability of wood-based composite building materials.

According to Laks, the decay resistance of an untreated wood composite member — whether it's a parallel-strand material like Parallam, a laminated veneer beam, or a glue-laminated timber — depends primarily on the wood species. Softwoods in general hold up better over time than hardwoods, Laks says (especially among woods used for engineered framing lumber). "For instance, some Parallams are made from yellow poplar," he explains. "If it's not treated, that will be less durable than a Parallam made from southern yellow pine or Douglas fir, in terms of fungal decay resistance and termite resistance."

For outdoor uses, any composite member should be pressure treated, Laks emphasizes. But he adds that different engineered materials have differing abilities to absorb treating chemicals. Parallam, for instance, is made from strands of wood and has "a pretty open structure," he says. "There is a lot of void space within the composite. It's more porous. That means it will absorb water much faster than a solid piece of wood of equivalent dimensions, and that also means that you can pressure-treat it more easily. You'll get really good penetration of preservative, because of that permeability, in a Parallam — better than an equivalent-size piece of solid wood."

LVL material, which is made up of thin veneers, is different. "All those glue lines can be quite impermeable," says Laks. "Generally, you get a better treated product from Parallam than from LVL."

Glue-lams are made from 2-by dimensional stock — 2x4 or 2x6 softwood. Sometimes the boards are treated before they are glued up into a beam, but more typically the beam is made first and then treated. Either way, says Laks, the member will take treatment pretty much the way regular softwood lumber would, because there are fewer glue lines to block the penetration of the chemical than in an LVL. By the same token, a glue-lam made of wood that takes treatment readily, such as southern pine, will be easier to treat successfully than a glue-lam made with a relatively impermeable wood such as Doug fir.

Manufacturing and treating defects can occasionally happen, so it's important to verify that good procedures were followed. When it comes to wood treating, says Laks, there are industry standards: the American Wood Preservers Association publishes guidelines for proper treating of composite members, with specific requirements for parallel-strand lumber, laminated veneer lumber, glue-laminated timbers, and wood structural panels. Some companies, however, forgo the AWP process in favor of obtaining an Evaluation Report (ER) from the International Code Council Evaluation Service (ICC-ES).

End users can verify lumber characteristics from markings applied to the lumber. Typically, treated wood members bear two stamps: one that pertains to the original "white wood" lumber, giving the name of the company that manufactured the lumber (often with a mill number), along with the wood species and grade and the logo of the inspection agency, and a second stamp or stapled-on tag indicating the date of treatment, the type of chemical applied, the level of chemical retained by the wood, the treating standard followed (either an AWP standard number or an ER number), and the intended use of the product (ground contact, above ground, and so on). — *Ted Cushman*