

WORKING WITH LAMINATED VENEER LUMBER

by Ned Murphy



Built-up LVL beams can be assembled on site and lifted into place without special equipment.

In the 15 years our company has been building custom homes, we've encountered many open floor plans where the architect has specified long-span beams. In these situations, we've used steel I-beams, steel channels, flitch plates, Parallams, and laminated veneer lumber (LVL). The best choice varies according to the situation, but the product we've found to be most versatile and readily available is LVL.

LVL closely resembles plywood, both in appearance and in the way the two products are manufactured. Veneers are peeled from logs, dried, and then graded visually and ultrasonically. Adhesive is applied to the veneers as they are stacked, and the stacked bundle is fed through a roller press, then sized with a rip saw.

New Material, New Rules

First-time users of LVL should carefully read the reference guides provided by the manufacturers. Because of LVL's ability to support long spans, the supporting posts at the end of LVL beams often carry considerable loads. Double trimmer studs are almost

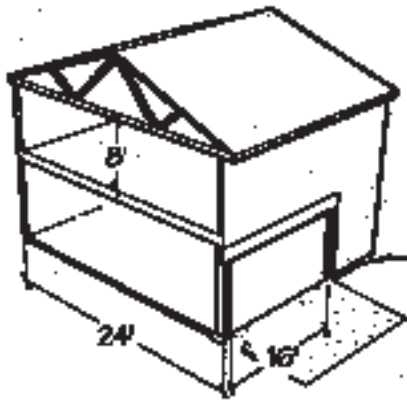
always specified, and in some situations, three or more trimmers are required (see Figure 1).

It's essential that plumbing, electrical, and hvac systems are considered during the design stage. Holes, chases, or notches should *never* be cut in LVL beams unless previously approved by the structural designer, and all subtrades should be made aware of this fact. When LVL is used as a flush beam, these cutting restrictions can present challenges when routing piping and ductwork.

Before ordering LVL, it's important to note the grade, species, and manufacturer specified by the designer. Douglas fir LVL is marginally weaker than yellow pine LVL, but I have yet to encounter a situation in which the species affected the sizing of the LVL beam. Before changing species or manufacturer, however, get approval from the designer.

**Laminated veneer
lumber is stronger
and stiffer than solid
wood and easier to
handle than steel**

Beam Sizing: Comparing the Options



The chart below compares various options for the 16-foot garage door header in the illustration. The header carries the weight of the walls above (10 psf), second-floor loads (40 psf), and roof loads. For each option, a beam size is given for both a 30-lb. and a 40-lb. snow load. The header is designed to meet an L/360 deflection criterion. Note that design values vary among brands and types of LVL, so it is not possible to substitute one brand of LVL for another without checking the specific manufacturer's design guide.

Material	E(psi)	F _b (psi)	Header / 30-lb. roof live load	Wt. (lb / ft)	Header / 40-lb. roof live load	Wt. (lb / ft)
Microllam LVL (2.OE ES)	2.0x10 ⁶	2,925	2 LVL@1 ³ / ₄ x18	18.2	3 LVL@1 ³ / ₄ x18*	27.3
Versa-Lam LVL (1 ³ / ₄ ")	2.0x10 ⁶	2,400	3 LVL@1 ³ / ₄ x18	24.3	3 LVL@1 ³ / ₄ x18	24.3
Versa-Lam LVL (3 ¹ / ₂ ")	2.0x10 ⁶	2,640	1 LVL@3 ¹ / ₂ x18	16.2	1 LVL@5 ¹ / ₄ x18	24.3
Versa-Lam "Plus" LVL	2.0x10 ⁶	2,800	1 LVL@3 ¹ / ₂ x18	16.2	1 LVL@5 ¹ / ₂ x18*	25.4
Gang-Lam LVL (So. Pine)	2.0x10 ⁶	3,100	2 LVL@1 ³ / ₄ x18	18.02	3 LVL@1 ³ / ₄ x18*	27.04
Gang-Lam LVL (Western)	1.8x10 ⁶	2,650	3 LVL@1 ³ / ₄ x18	23.63	3 LVL@1 ³ / ₄ x18	23.63
Gang-Lam LVL (Western)	2.0x10 ⁶	2,950	2 LVL@1 ³ / ₄ x18	15.75	3 LVL@1 ³ / ₄ x18*	23.63
G-P Lam LVL (1.8 E)	1.8x10 ⁶	2,250	3 LVL@1 ³ / ₄ x18	24.6	3 LVL@1 ³ / ₄ x18	24.6
G-P Lam LVL (2.0 E)	2.0x10 ⁶	2,850	2 LVL@1 ³ / ₄ x18	16.4	3 LVL@1 ³ / ₄ x18*	24.6
Parallam	2.0x10 ⁶	2,900	3 ¹ / ₂ x18	19.7	5 ¹ / ₄ x18	29.5
Glulam	1.8x10 ⁶	2,400	5x16 ¹ / ₂	22	5x17 ⁷ / ₈	24
Glulam	2.0x10 ⁶	3,000	5x16 ¹ / ₂	22	5x16 ¹ / ₂	22
A36 Steel	30.0x10 ⁶	22,000	W8x31	31	W8x35	35
			W10x22	22	W10x26	26
			W12x19	19	W12x22	22

*Design controlled by L/360 deflection

LVL is available in lengths up to 60 feet, but think twice when ordering long lengths of the material. I learned a painful lesson when a delivery truck carrying 60-foot lengths couldn't make the swing into the building lot from the street. Carrying 400-pound LVL to the job site is an experience I'd like to forget.

Lead Time Is Important

When using LVL, it pays to plan ahead. While many lumberyards in my area stock a limited supply of the product, they seldom have all the lengths or widths required for a large project. I place my orders two weeks in advance so the material will be delivered when I

need it, and I include any required special connectors in the order.

Connection Hardware

Connectors for just about any situation are available from Simpson Strong-Tie Co. (4637 Chabot Dr., Pleasanton, CA 94588; 800/999-5099), but when assembling LVL hips, valleys, or other angled connections, we've sometimes found it impossible to properly install premanufactured hangers. In these situations, we have custom saddles fabricated, and we through-bolt all connections. It's a good idea to line up a fabricator before you begin a complicated project, so any discrepancies

between the drawings and job-site conditions can be resolved quickly.

Weather Protection

My first experience with LVL occurred during a wet autumn about ten years ago, and it was less than ideal. The LVL beams were exposed to the weather, and the veneers absorbed substantial moisture. Even though we followed the manufacturer's nailing schedule, the built-up LVLs cupped as if they had no nails in them. We ended up through-bolting the entire beam.

Manufacturers now coat their LVL with a waterproof treatment that protects the product from moisture. I prefer



Figure 1. LVL headers may require three or more trimmer studs to support the increased loads they're capable of carrying.



Figure 2. Clamps help with alignment when nailing or bolting together a built-up LVL beam.

the black, waxlike material that Truss Joist MacMillan uses on its Microllam LVL, even though the coating rubs off on hands, clothing, and tools. Be careful: These waterproofing treatments make LVL slippery stuff to handle. The members will often slide in unpredictable ways as they're maneuvered into place.

Despite the waterproof coatings, LVL will still cup when exposed to moisture (although not as severely as in the past). We store LVL well off the ground and cover it with a tarp. It's important to inspect all LVL material when it's delivered but before it's unloaded. More than once, I've rejected cupped LVL that was stored improperly at the lumberyard.

Ganging LVL

With few exceptions, we fasten individual LVL members together to form built-up beams. In dry conditions, when cupping isn't an issue, I hand-nail these built-up beams using five rows of 16-penny hot-dipped galvanized nails, spaced 16 inches on-center. The crew would rather use a nail gun for this chore, but I've found that hand nailing does a better job of drawing the members together.

To keep the edges flush during assembly, we begin nailing at one end of the beam and use a clamp to align the edges as we nail off the beam (Figure 2). If you plan to use a nail gun, make sure you use a strong compressor and a gun with lots of power. LVL material (especially the yellow pine variety) is hard stuff.

On complex projects where LVL will be exposed to extended wet weather before "dry in," I bolt the individual members together to ensure that cupping won't be a problem. Predrilling the bolt holes allows us to assemble heavier built-up beams in place — an important advantage when you consider that a 20-foot, three-member LVL beam can weigh in at 400 pounds. To ensure that the predrilled holes will line up during assembly, we clamp the members together on sawhorses, and drill all of the holes in one session. In the case of flush beams, we're careful to lay out any joist framing before drilling, so the bolts

won't interfere with joist placement.

Species can make a difference. I recently noticed one of my carpenters fastening two LVL members together using a cordless drill and 3-inch coarse-thread wood screws. My first reaction was to be amazed by cordless technology, but after closer inspection, I realized that the plies used in the LVL were Douglas fir, not the yellow pine I was accustomed to. The Doug fir LVL is easier to fasten, and because it's 10% lighter, easier to handle as well. ■

Ned Murphy owns E.J. Murphy Builders in Framingham, Mass.

LVL Manufacturers

Boise Cascade
P.O. Box 62
Boise, ID 83707
800/232-0788
Versa Lam

Georgia Pacific
133 Peachtree St. N.E.
Atlanta, GA 30303
800/423-2408
G-P Lam

Louisiana Pacific
2706 Hwy. 421 North
Wilmington, NC 28401
800/999-9105
Gang Lam

Tecton Laminates Corp.
Hwy. 20
Burns, OR 93778
800/825-8120
TecLam

Truss Joist MacMillan
200 E. Mallard
Boise, ID 83706
800/338-0515
Microllam
Circle #19

Willamette Industries Inc.
One E. Saginaw Rd.
Saginaw, OR 97472
503/744-4655
StrucLam