Trusses vs. Rafters

by Jamie Fisher

A critical decision in every house or addition design is whether the roof will be stick-framed or built using prefabricated trusses. Sometimes this decision hinges on factors other than design. For instance, if the exact plan and profile can be achieved using either method, then why not go with the trusses? Using trusses puts someone else on the hook for engineering, and it usually saves money, since trusses require narrower lumber and let you erect the frame quickly and with less-skilled labor. On the other hand, if a remote or congested site makes placing trusses impractical, then obviously stick-framing is a better option.

However, truss-versus-rafter decisions often hinge at least partly on issues of design. Here are a few issues that I've found to be particularly relevant.

Attics

Perhaps the most familiar design consideration here is attic space (see Figure 1). If the clients want a flat ceiling but don't need usable space above, then the framing decision can be structurally driven rather than architecturally driven — a situation that favors the faster, cheaper trusses. If the spans involved are long, that favors trusses all the more.

On the other hand, if you want a usable attic, think rafters. Yes, they make attic trusses, and yes you can store boxes and the like up in a truss roof, but if you want real, flexible attic space that's well-insulated, too, you're better off with rafters.

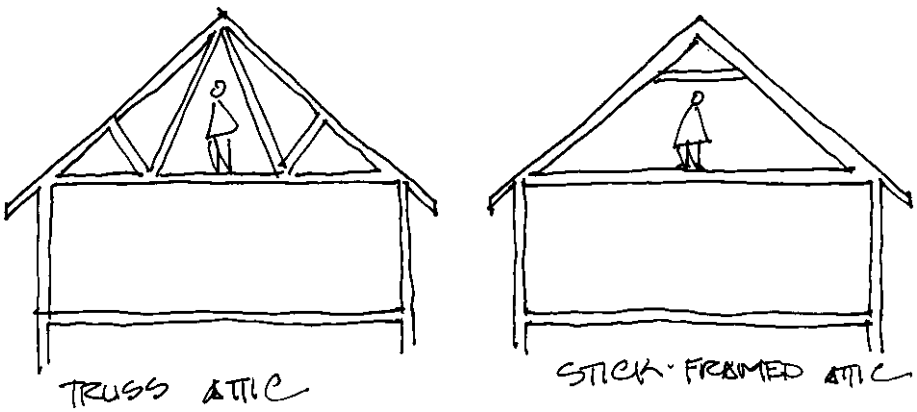

Figure 1. Rafters provide more options for livable attic space.

Sloping Ceilings

At other times, you may want to have a partially sloped ceiling in a room (to stay below a height limit, for instance), as in a story-and-a-half Cape (Figure 2). In this situation, trusses may impose more limits than their cost savings justify. The trusses manufactured for this situation, called tail-bearing trusses, will work, but for anything but the shortest spans they require a deep top chord, which erases some headroom, and they often require you to sister one or two additional members to the tail in the vicinity of the heel. For longer spans, the engineer might just say "forget it." For all those reasons, rafters usually work better and more flexibly for sloped ceilings.

Skylights

Trusses and rafters affect skylight choices in different ways (Figure 3). Trusses allow many of the standard skylight arrangements, and generally allow widths up to 46 1/2 inches. However, if you want a wider skylight, a long skinny skylight across the framing, or a splayed skylight well (a good idea in thick ceilings), then trusses may not provide the flexibility you need. This is more of a judgment call than some of the other options, since tastes will vary among clients. However, it's worth knowing that rafters usually allow more

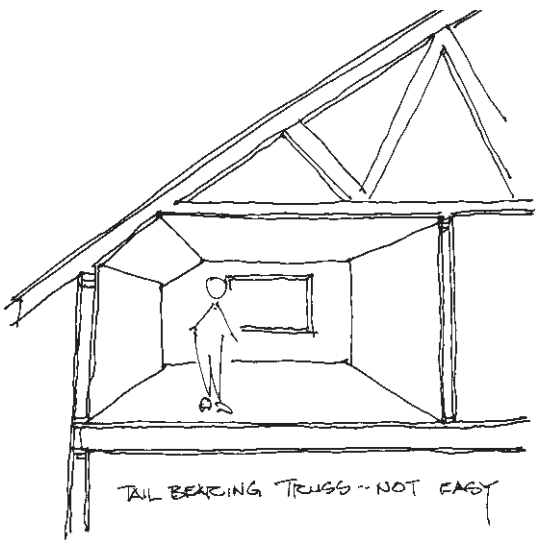

Figure 2. Tail-bearing trusses may work for story-and-a-half designs, but only for shorter spans. The author prefers rafters for this situation.

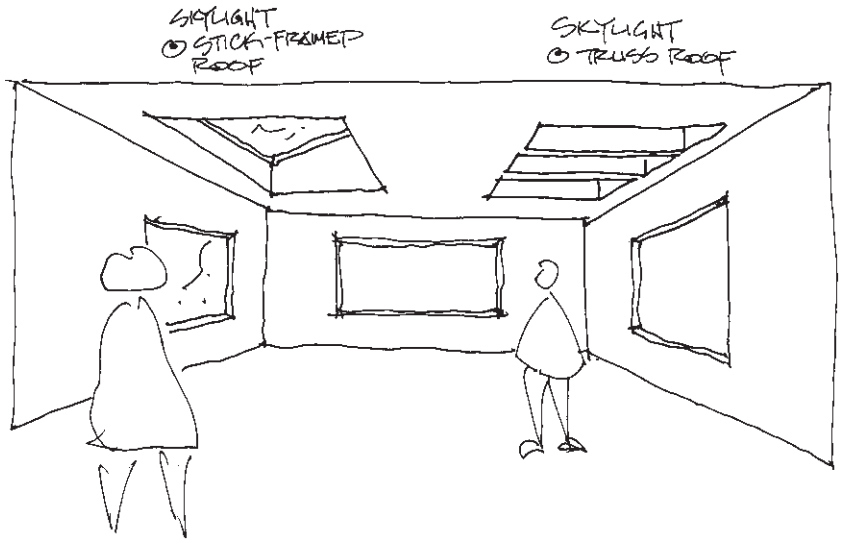

Figure 3. Trusses will typically accommodate skylights up to 4 feet in width. Rafters are better for wider skylights or for flared wells.

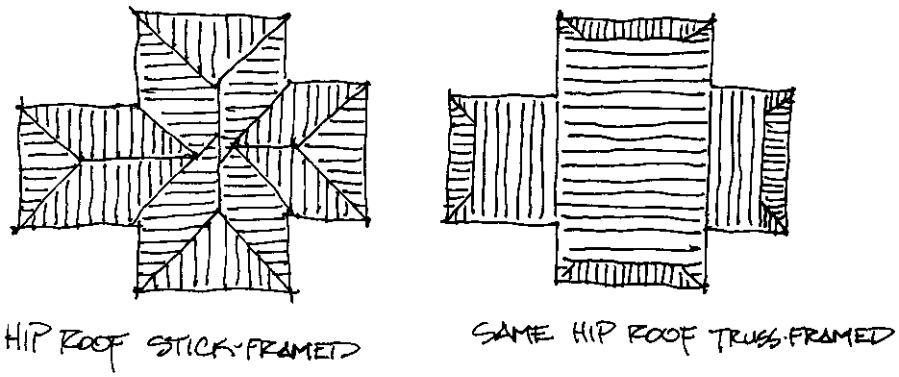

Figure 4. When no attic space is needed, trusses can simplify the framing of many complex roof forms.

options than trusses do when it comes to skylights.

Odd Problems

If you're tying an addition into an older house, or if some other circumstance makes reliance on careful field measurement risky, then trusses are a much bigger risk than rafters. With trusses, you're stuck with what comes off the truck, whereas rafters can be fussed with to accommodate almost any weirdness.

On the other hand, trusses can sometimes help you out of a jam where rafter framing would bring the load down on a spot where you don't want a partition or post. In that situation, trusses can sometimes save the day, because trusses usually carry the entire roof load to exterior walls, and do so without using big heavy beams or members at hips, valleys, and ridges (Figure 4). Depending on the design, this can give you a lot of floor plan options that rafters won't allow.

These and other design issues regarding trusses should not necessarily be the sole criteria for making your choice. As with most design decisions, you'll need to weigh them against considerations for cost, speed, convenience, and the experience and capabilities of your crew or subs. However, knowing which issues to watch for can help you make deliberate choices between options during the design stage instead of simply living with unintended consequences later.

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