

GETTING INTO Modular Construction



I've been building houses in the Toledo, Ohio, area since 1987. For most of that time, my focus was on custom homes in the \$250,000-

by Doug Holdridge

\$300,000 range. But over the past few years, a worsening shortage of qualified trade contractors was making it more and more difficult to thrive in that area of the market. Since I had no crew of my own and subbed out most of the work, I was faced with drawn-out build schedules and cost fluctuations that made me uncomfortable.

After six months of researching some possible alternatives by reading, surfing the web, and touring several modular-home plants and talking with factory representatives, I decided that the best way to speed production and reduce uncertainty was to begin building cus-

Custom modulars offer clients the advantages of stick building with fewer headaches for the builder

tom modular homes instead of stick-built homes.

My research also convinced me to move into the less expensive first-time-buyer market, which in my area means building houses that sell for \$150,000 to \$175,000. Few builders move from more expensive to less expensive homes — the usual progression goes the other way — but strong local demand for lower-priced housing made that the best way to take advantage of the speed and simplicity of modular

construction. Although my per-house income would decline, I'd be able to build more houses in the course of a year, boosting my overall profits.

Today, with about ten modular projects under my belt, things have worked out every bit as well as I'd hoped. Going modular has also freed up my time enough to allow me to spend much of the past year putting together a local 100-house development. Once the construction phase starts, I plan to build modular houses in the development as



Each module arrives on the building site on a steel carrier towed by a tractor-trailer rig. Pitched roof sections are folded down for shipment. Windows, doors, and most exterior trim are already installed, and the front and back walls are covered with vinyl siding enclosed in a protective wrap. The gable ends will be sided after the installation is complete. After the modules are delivered, two or more carriers can be stacked for the return trip to the factory. The rear module is craned onto the foundation first, with its roof still in the folded position. The set crew powder-fastens support posts to the basement slab and bolts them to the central LVL girder.

well, which will give me the benefit of volume purchasing and allow me to offer buyers a very attractive price.

Cost and Quality

Modular construction allows me to take advantage of the manufacturer's volume discounts on materials, and the accelerated build schedules help keep the price affordable for both buyer and me. When all the bills are paid, I've found that a modular costs about 10% less to build than a comparable stick-framed home. In addition to offering a variety of plans, each manufacturer also provides a range of options for good-quality fixtures, trim, cabinets, and other features.

Most of the modular companies I work with, for example, use Merillat cabinets, GE appliances, and windows from major manufacturers like Andersen and Pella that are better than the low-cost generic windows found in many stick-built houses in the same price range. Buying these items through a modular manufacturer gives me the benefit of volume discounts on name-brand products, so I don't have to compete with stick builders on price and quality.

The bottom line is that modern modular houses are as good as or better than comparable stick-built houses. I often take potential buyers through a local development of about 70 homes, about a third of which are moduls. No one has yet been able to distinguish



the modular homes from their stick-built neighbors.

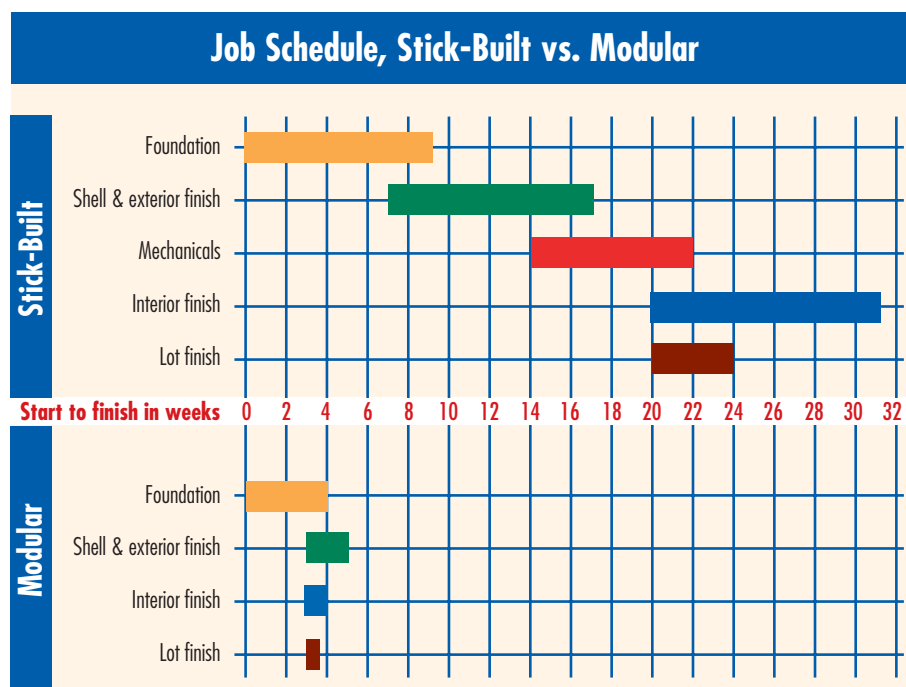
In addition, the controlled environment of a manufacturing facility reduces quality-control problems and makes concern about variables like bad weather and finding good help a memory. Because the factory is always dry, there's no chance that rain-soaked framing members will warp or plywood will swell or delaminate. As a result, I get straighter, better-looking walls and floors.

Business Advantages

While material prices for stick builders can change from one day to the next, modular manufacturers only increase their prices every two to four years. That price stability allows me to write very tight estimates. When I send a set of drawings to a manufacturer, I generally have a firm price in hand within a matter of days. After I enter the costs of site work and finish, I have an accurate cost figure that isn't subject to unexpected change.

Less is more. Depending on the manufacturer, the time of year, and the complexity of the plan, the time between placing an order and taking delivery of the completed house runs from as little as two weeks to several months. Besides the advantages of shorter build schedules and the benefits of building in a manufacturing facility, this system has other benefits. I no longer have to deal with a framing, roofing, insulation, or drywall sub because all that work is done by the manufacturer. As a result, I no longer have to spend hours researching materials invoices to make sure they're accurate. I have fewer phone calls to make, fewer 1099 forms to prepare, and fewer insurance certificates to collect for the annual insurance audit.

All this translates into much less time spent on administration. As an example, the last custom home I built required me to write 149 checks, while the last modular home I built required only 33. Because the projects are completed much faster, I also enjoy reduced



As demonstrated by these simplified construction schedules drawn from two of the author's recent projects — one for a 2,000-square-foot stick-built house and one for a 1,600-square-foot modular — a modular job is measured in weeks, rather than months. While differences in size and cost between the two projects mean that this isn't a true apples-to-apples comparison, the benefits of modular are apparent. Note that the exterior finish work, interior finish, and lot finish begin simultaneously when the house is delivered to the site, midway through the third week, rather than spread over a span of 13 weeks.

insurance costs. My waste-removal costs are minimal, and the homeowner pays less interest while waiting for the house to be finished.

Marketing, Design, and Financing

In my experience, modular-home buyers are a tech-savvy group, and many of them have spent quite a bit of time researching the subject on the Internet by the time I encounter them. In fact, many of my initial customer contacts come about through the Internet, through either my own website or modular manufacturers' sites.

Here's how it works: As potential customers browse for their ideal house plan from various manufacturers, they often request additional product information by filling out electronic forms. Manufacturers are wholesalers and aren't interested in dealing with retail sales, so they pass the information on to builders who operate in their area. Because I build homes from several

different manufacturers, I'm not dependent on electronic leads from any one firm.

Another source of leads is a site run by an association of modular builders, modularcenter.com. It offers information on modular construction, as well as links to manufacturers and to builders like me. Most potential buyers who go to the Internet end up there eventually, because typing the words "modular home" into any search engine will lead them there. The annual fee for a listing is \$100 per year, plus a small percentage of each sale made from a lead supplied through the site.

Design options. Each modular manufacturer has its own portfolio of stock plans, and once they've settled on a particular manufacturer, many buyers are happy to choose a model directly out of the catalog. But manufacturers have learned that if they want to move into the territory that's always been occupied by stick builders, they



Once the roof section is erected by the crane, folding truss webs lock it in position. Next, the front module is craned onto the foundation and butted tightly against the previously placed rear unit. The crane also makes short work of positioning the piggyback trusses, sheathing, and shingles needed to complete the roof. The set crew stick-builds the garage, which the author finds more cost effective than shipping in a modular garage.

have to give buyers what they want. If the customer provides a print or a floor plan, any good modular manufacturer can redesign it as a modular. The main design limitation has to do with moving the modules to the site. If the modules are kept to 13½ feet wide or so, transport isn't a problem. State laws vary, but once you get up to 16 feet in width, you usually need a state police escort in front and back as the module travels to the site, and that gets expensive. There are also architects who specialize in custom modular designs, although that isn't my usual market.

Working with the bank. Like conventional homes, modulares are financed through standard home mortgages and appreciate in value at the same rate as comparable stick-built homes. (Don't confuse modular houses with HUD-code houses, which banks typically treat as personal property like a car or a boat.) Even so, financing a modular is somewhat different than financing a conventional home. The bank typically makes a 10% down payment to the manufacturer when the house is ordered and pays the remaining 90% on delivery. Normally, the bank sends a representative to the site with a check on the day the home is delivered, because the driver won't unload it from the truck without payment. As the contractor, I get paid by a standard draw, starting with the completion of the foundation.



Foundations and Setting the Modules

I put my houses on a poured foundation with a full 8-foot basement because that's what buyers in my area want. We have a very good foundation sub who takes care of all the site work: He excavates, pours the garage slab and foundation, and even sets the plates. Accuracy is important here. You can fudge a stick-built house if the foundation is a little off, but that's harder to do with a modular. When you set the modules down, you want to be sure they're going to fit.

The modules arrive on steel carriers towed by tractor-trailer rigs; they're met by a four- or five-person set crew and a local crane and operator. The manufacturing company can provide its own crew, but I prefer to hire the same setting sub every time.

From rigging to roofing. The back module usually goes on first. It's strapped for the lift, craned off the carrier, and carefully set down on the foundation. The set crew places support posts under the central girder and erects the rear half of the fold-down roof trusses. The front section of the roof is raised before the front module is strapped and eased into place. This leaves a gap at the ridge, which is closed off with piggyback trusses that are craned onto the roof along with the necessary OSB sheathing and shingles. The whole process, from the arrival of the truck to closing off the roof, takes about half a day.

Stick-built garages. Factory-made garages are available, but I've found that they're not cost effective. Compared to a house module, which is braced by interior partitions and a rigid floor



assembly, a garage is basically a big flexible box with no bottom. The factory has to add a lot of expensive temporary bracing to stiffen it for transport, which offsets the cost savings of modular construction. I eliminate that added cost by having the set crew stick-build my garages.

Mechanicals and Finish

The modules are fully wired at the factory, so all the electrician has to do is hook up the wiring between modules, install the prewired main panel in the basement, and connect the service entrance cable. The plumbing fixtures and concealed supply and drain lines are also installed at the factory. The factory can do the overhead plumbing in the basement, except for the interconnections between modules, but I save some money by doing the overhead supply plumbing myself. I have the manufacturer stub all the fixtures into the basement, and I finish the installation with the Manabloc home-run system, which uses PEX

tubing. My plumbing sub finishes the drain lines.

Some modular manufacturers can install a complete heating and air-conditioning system at the factory, but I prefer to have my own hvac sub install a gas-fired forced-hot-air system after the house is on site. The house arrives with precut register openings in the floor. My modular homes perform well enough to receive an EPA five-star rating, which translates to an expected energy cost of \$432 annually for a 1,500-square-foot home.

Flooring, trim, and siding. The factory hangs most of the doors, installs interior trim, and installs most types of finish flooring, including laminate, vinyl, and hardwood. Carpeting can also be factory installed, although I prefer to do that after assembly. There's still a good deal of trim work to do where the sections join. My other key sub, in addition to our foundation guy, is the carpenter who handles all the interior and exterior finish work, including siding.

Problems and Limitations

Despite its advantages, modular construction isn't trouble free. I spend much more time than I would like fixing drywall cracks, rehang doors, repairing damaged trim, and dealing with other punch-list items. Some of those problems are unavoidable when you ship a house over hundreds of miles of road, but I don't think they should be seen as the builder's problem. Unfortunately, few manufacturers have the staff to deal with these kinds of customer-service issues in a timely manner. It can take so long to get the factory to address or credit the repairs that I usually end up putting on my tool belt and fixing them myself. That keeps things moving, but it means I end up absorbing the cost of repairs. I'd like to see more manufacturers follow the lead of one Michigan firm, which gives a blanket 3% credit to fix minor problems when the home lands on the site.

Getting options outside of the respective manufacturers' standard construction process is also difficult. I suspect that's because modular construction is an assembly-line process and lack of either space or training prevents deviation from the norm. For example, I can get hip roofs from only one manufacturer and 9-foot walls on ranch-style homes from only one other. In a site-built home, there is more flexibility of materials as well. Manufacturers make arrangements for volume discounts with material suppliers, and that keeps the cost down.

This also means that some of the products used by modular builders, such as roofing shingles and siding, may differ from those available through the usual commercial channels. If you don't plan ahead, that can make it difficult to match materials, and nobody wants to spend half the day driving somewhere to get the right color J-channel. Where possible, it's best to specify branded materials that can easily be matched locally. 

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