Finish Carpentry, Production Style

Prepping the job with tools and materials eliminates extra movement and speeds installation

by Ross Welsh

I'm a trim carpentry subcontractor in Sacramento, where my company specializes in large subdivisions. Many of our jobs involve trimming out more than 100 homes at a time. While carpenters who aren't familiar with this environment might expect the work to be dull and repetitive, I've found that doing it well is a challenge and calls for a special set of skills.

We're careful to vary the work so people don't get bored. A carpenter might install doors for most of the day, then later notch 45 window stools. The next day, he might do shelving or baseboard. Organization and overall efficiency are critical. A production trim carpenter has to do accurate work, because materials are so tightly estimated that there's little extra stock available to fix mistakes. Trimming out an entire 2,800-square-foot house usually yields only a couple of handfuls of scrap.

Getting Ready

Although all the homes in a given development are similar, most builders offer a variety of options, such as crown molding, upgraded trim, and premium entry doors. The best GCs

will post a list of the buyer's selections on a window or garage wall early, so we know in advance what options are included (see Figure 1).

Plans and FAQs. Before we start a new group of homes, I spend some time going over the plans with my foreman, the framer, and the suppliers on the job. This allows us to make corrections early so they don't eat up valuable time and materials. I then make a three-ring binder for each house filled with mini-plans that I generate from the simplified floor plans included in the builder's sales brochures. My mini-plans show door swings and sizes, shelving arrangements, and the heights and locations of easily forgotten items like towel bars and paper holders.

The binder also contains a set of our installation guidelines for the particular subdivision we're working on, which lay out the basic ground rules for the project (see next page). These two documents contain the answers to most everyday questions and save the carpenters from having to track me down or bother a supervisor for the information. I give the binder to the crew leader, who makes it available to the carpenters on the job.

Stocking Material

A few days before we start a job, the builder arranges for delivery of the trim package. This may seem unusual to trim carpenters in some areas, but it's a common arrangement in California production housing, where high-volume builders use their purchasing power to buy materials at the lowest possible prices. It also frees subs like myself from dealing with suppliers and allows us to focus on what we do best.

When we get the trim package, it's been partially prepared by the supplier. The casing is precut, and the shelving comes as a package of components that includes the shelves, poles, hook strip, pole supports, and sockets. Window stools and aprons are cut to within 1/2 inch of the size needed, and baseboard and crown molding are delivered in 16-foot lengths (Figure 2).

Figure 1. Builder option lists show all products and details that deviate from the standard spec. Good builders post them in the home to spell out the options that the homeowner has chosen, allowing the author's crew to confirm that the correct materials package has been delivered.

Figure 2. The partially prepared trim package is delivered to each house, where the first task of the trim carpenters is to break it down and distribute the material from room to room.

Installation Guidelines for XYZ Communities

XYZ Communities posts a floor plan and features list in the rear window (first floor) of each house they build. Please review these lists each time you work on a house to familiarize yourself with the options that affect your work. For instance, look for changes in door swings, upgraded hardware, etc. XYZ offers many options to their buyers, so please don't assume that any specific plan is always built the same.

- Mirrored bipass wardrobe doors are standard in master bedrooms. But mirrored doors go in other bedrooms as an upgrade option in many houses. Please review the features lists to be sure you're installing the appropriate bump jamb.
- Bump jambs are set back 3/4" from the bipass opening. The back of the wardrobe track for wood doors is set to the back edge of the bump jamb, and the valance lies over the opening by 1 1/2" each side and 1" up on to the header. The material is 3 1/4" wide, so it covers the track by 2 1/4".
- Be prepared to fully adjust exterior doors at interior trim stage. Do not case until door operates properly.
- Window stool apron is cut at 30 degrees.
- Follow shelving layouts on mini-plans. Standard heights are as follows:
  - 5 stacks behind a door measure from floor to top of cleat: 16", 30", 44", 58", 72". This is typical for reach-in pantries.
  - 4-plus-1 stacks measure from floor to top of cleat: 24", 38", 52", 66", 80". This is typically used in master wardrobes with 16"-deep partitions, four 16"-deep lower shelves, and one 12" top shelf at 80". The shelf at 80" often ties in with a shelf and pole at 80". Master 5 stacks have the same heights as 4-plus-1 stacks.
  - Face frame 5 stacks measure from underside of header to top of cleat: 14", 28", 48", 62", 78". The shelves must come flush to the front of the opening.
  - Standard single shelf and pole height is 66" to top of hook strip.

- Pole supports are spaced no farther apart than 32". Do not install any rosettes, poles, or pole supports unless all the pole supports are installed. This is known as our all-or-none rule.
- Trim all interior attic access holes with door stop to support drywall lid.
- Garage attic access doors must be installed with at least two 3" screws in each jamb. Install passage knob at time of door installation.
- Case all patio doors.
- Install 2"x2" support at all thresholds.
- Standard towel bar height is 48" above finished floor. Wall-mounted paper holders are 24" above finished floor and 24" from back wall. Cabinet-mounted paper holders are 4" to 6" below countertop. Follow mini-plans for bar, ring, and paper holder locations. If you have any questions, ask Ross or the lead carpenter on the job.
- Standard installation of spring bumps is at the bottom of the door so it hits baseboard.
- On exterior doors, install two 3" screws at each hinge and two at each strike plate.
- Install shower poles above tile.
- Check hardware packages against the features list to confirm you are installing the correct package. Don't assume the package on site is correct. Also, inspect all hardware for dents and scratches as you're installing it. Don't install damaged hardware. Put it back in the box and give the box and a shortage list to the superintendent or his assistant.
- Please scrap out each house when you're finished each day.

Finally, XYZ strictly prohibits eating in the houses, parking on the driveways, or interfering with the erosion-control materials. Doing any of these things can result in heavy penalties. Please abide by these rules at all times.

Thank you in advance for reviewing these guidelines and following them.

A critical element in the planning process includes generating a set of installation guidelines meant to answer carpenters' frequently asked questions so that they don't have to bother a site supervisor or track down the boss. The author has found this extra effort at the beginning saves time and reduces mistakes.

Figure 3. The author's tool bucket and the materials to install and trim a door are perfectly placed to reduce needless effort. One carpenter will install the door, and another will follow to install the trim package.

One popular design in our area is a 2,800-square-foot, two-story model with 15 interior doors, 15 windows, 28 shelves, baseboards with radiused corners, and lots of decorative columns and pop-outs. If we assign three carpenters to such a job, we can finish it in one day. If all goes well, one carpenter will have a couple of hours at the end of the day to start spreading material or hanging exterior doors in the next house.

Spread out. Before we can start making sawdust, the material package needs to be spread throughout the house. The idea is to place the materials within easy reach of where they'll be needed but out of the way of other operations in the same area. Spreading the material properly also confirms that the package is complete.

In the morning, two of the carpenters start spreading doors and casing, while the third sets up the compressor, hoses, and a miter-saw work station. It's important for one carpenter to start hanging doors within the first half hour, because most of the trim can't be installed until after the doors are in place. One of the spreaders soon begins cutting and building wardrobe and pantry shelving, leaving the third to make sure the others have the tools and materials they need to keep moving ahead.

Door Installation

Prehung door installation is best thought of as an assembly process. I keep shims, a white mallet, a pry bar, and a drywall saw in my tool bucket. We place the bucket near the latch side of the door opening and hang my nailer on the bucket by its belt hook. The bucket should be out of the way but within easy reach. We place the prehung door assembly near the hinge side of the opening, with the hinges facing into the room (Figure 3). We lean the precut casing against the wall just one more step away, for easy access later. Strategically spreading the material and positioning the tools this way make a huge difference in installation time. If you find yourself moving the door or casing out of the way when you walk into the room, it was put in the wrong place when the room was stocked.

Floating jambs. I start by cutting back drywall from the rough opening with the drywall saw and removing the shipping nails from the door unit with a hammer. After slipping the prehung unit into the opening, I open the door 90 degrees; it should stand on its own. If it's being installed in a room with carpeting, we block the jamb up about 1/2 inch to allow the carpet to be tucked underneath. Next, I hold the doorjamb close to the upper hinge and shoot two nails through the jamb near the top, making sure the jamb is about 1/8 inch away from the trimmer stud (Figure 4, next page). My goal at this point is to "float" the assembly in the rough opening, as close to its final position as possible. I continue tacking with two nails near the bottom hinge and four nails spread top to bottom along the latch side. At this point the jamb should be floating in the rough opening and not touching the floor or the trimmer studs.

Keeping the jamb away from the rough opening at first allows me to move it in any direction later, as I manipulate the jamb and check its relationship to the door and the wall. I usually start by shimming at the bottom hinge and continue around the frame. The pry bar can quickly close a margin or raise a jamb leg, and the mallet can bring a jamb leg into the plane of the opening. The process is a gradual series of shimming, nailing, and adjusting. As a general rule, I try not to nail too much too soon.

To plumb or not to plumb. I adjust cross-legged jambs at the bottom, where the casing can be rolled in or out, while keeping the head jamb flush with the wall so the casing will have nice tight miters. When I have to choose between actually plumbing a door and installing it to appear plumb with adjacent walls, I take the latter approach. Hiding other people's mis-

Figure 4. The first step in installing an interior door is to shoot a couple of nails into the top of the hinge side of the jamb. Leaving space between the jamb and the framing at this stage makes it easy to drive shims into place later (A). After the shims are in place, the door should open and close freely without hitting the jamb or binding at the hinge (B). Adjustments are simple to make if the jamb is allowed to float until everything lines up correctly. A soft rubber mallet helps to bring the jamb into alignment with the opening without marring or denting the material (C). The head-jamb reveal is easily adjusted with a flat bar after the jamb is tacked in position (D).

takes is part of the job, and making the door and casing parallel with an adjacent corner is usually more important than hanging it plumb.

After the door is thoroughly shimmed and nailed and is working well, I reach for the drywall saw and cut off the shims. Next, I grab a head casing and hold it in position on the head jamb. The head casing's length determines my reveal and leads the way for positioning the legs. I usually slam the door a couple of times while I'm casing, just to make sure the installation is correct. Doorknobs will be installed later.

Baseboard

The first step in baseboard installation is to study the option list to determine which areas will be carpeted. We install the baseboard in those areas first, leaving the remaining base for the final base-over trip. To ensure accurate measurements, we use a garden scraper with a long handle to clean up the drywall at corners and knock away blobs of joint compound.

Recording measurements. Baseboard measurements are taken behind the door installer. Each of us uses a slightly different notation for recording our measurements, but they all involve writing down the length with notations

to indicate the type of cut for each end. (To avoid confusion, each crew member cuts only his own material.) For example, a back slash to the right of a number means inside miter to me. That same slash to the left means an outside miter, and the addition of a "2" means $22\frac{1}{2}$ degrees. Measuring needs to proceed systematically; personally, I work from left to right.

Miter-saw tips. Accurate measuring and efficient handling of material at the saw are vital to working productively. We use miter saws mounted on folding tables and roller stands to support our work. That equipment is very portable, yet sturdy enough for the job.

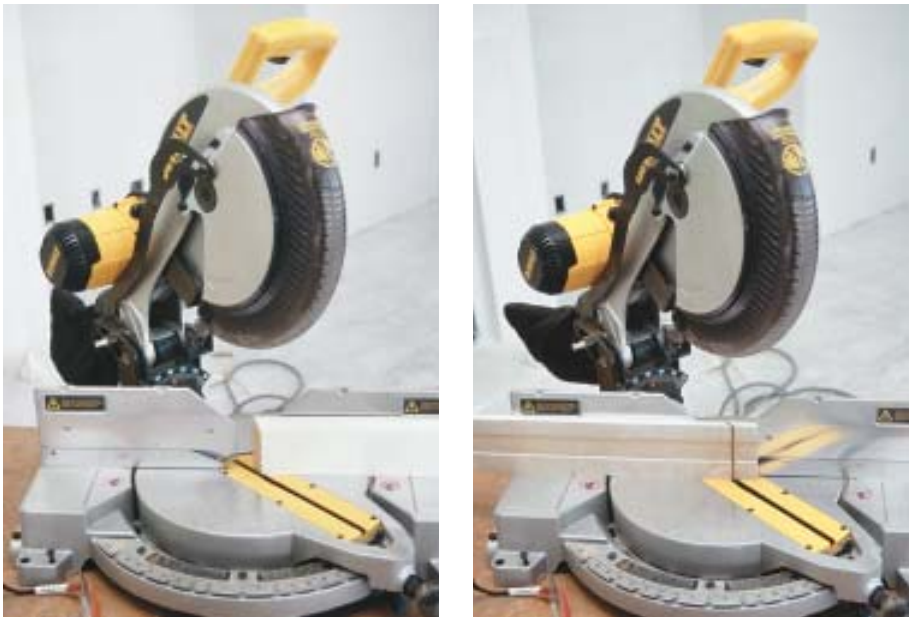

Figure 5. When mitering baseboard for an inside corner at each end, the left miter is cut first, with the saw tilted right and the material right side up (left). The material is slid to the left and marked to length on the back-bottom corner. To make the right-hand cut, the baseboard is turned upside down on the fence, leaving the mark facing up and clearly visible (right).

Figure 6. In areas that will be carpeted later, the base is held $\frac{3}{8}$ inch above the floor with a mini pry bar as it's tacked in place.

The flow of material should go from one side to the other, with the material within easy reach to keep it oriented consistently. Personally, I like it face up with the top away from me. I pull stock from my right and first make the left cut, which becomes the zero end for my tape. After I've cut the right side, the material continues its flow to the left and is stacked in order room by room.

Because I'm right handed, I try to keep the saw swung right whenever possible for better visibility, flipping the material as needed (Figure 5). As the stacks of baseboard accumulate, we distribute them to the appropriate rooms and stand the material in position, ready for installation.

Longs and shorts. In general, we try to cut the material in order of installation. Sometimes we will cut a few long pieces first to create medium and short offcuts for economical use of material, but shorts are plentiful later so we're careful not to overdo it. While we're cutting base, we make a bunch of little pieces to follow the rounded shape of the bullnose outside corners that are common in our area. Unlike a typical 90-degree corner, they require a third corner piece cut at $22\frac{1}{2}$ degrees on both ends. With the saw set at $22\frac{1}{2}$ degrees, we make the first cut, then flip the material, slide to a standard mark, and make the second cut. Keeping the saw in the same position, we flip the stock back over for another first cut and repeat until we have enough. We carry a few undersized and oversized corner pieces with us to give us some flexibility when we're fitting and nailing.

Tacking and nailing. When nailing, we carry a mini pry bar and a pneumatic finish nailer; plus, we keep a hammer and nail set nearby. To nail off, I tack the baseboard in place while holding it up $\frac{3}{8}$ inch with my mini pry bar, so carpet can be tucked under it later (Figure 6). I tack in the same direction I measure and cut — that is, from left to right, since I'm right

handed. If everything fits, I backtrack and finish nailing. Walking backward, I keep my left side to the wall and sight down each stud, bringing the nail gun in with my right hand.

Any miscut pieces noticed when tacking should immediately be set aside with a note written on the piece describing the mistake. At this point, we don't go back to the saw, because trips to the saw waste time. If we need a break from the repetitive task of fastening and have a few corrections to make, we do a group of recuts all at once, saving some time.

Handling small pieces. Decorative arch pop-outs, especially those with bull-nosed drywall corners, can have as many cuts as an entire bedroom. Holding all the tiny pieces and fastening them safely present a real challenge. If a house we're working on has a lot of areas like that, we use a hot-melt glue gun to temporarily hold them in position. We've found that once the gun is thoroughly heated up, the glue will remain fluid for about five minutes after it's unplugged, making it into a sort of low-tech cordless tool. We glue the tricky little pieces to the wall before we nail them, which allows us to keep our hands out of harm's way (Figure 7).

Shelving

Shelving requires moving the most tools, but it can still be done by making one trip to a bedroom with your arms full. We carry a nail gun, a cordless circular saw, a cordless drill, and if the shelving is elaborate, a 4-foot level. The hand tools in your tool belt should include a 12-inch speed square, torpedo level, 12-ounce hammer, nail set, mini pry bar, #2.5 pencil, small elementary-school-type sharpener (Staedtler #51027), a good 16-foot tape measure, and a supply of 2-inch screws and 1 1/2-inch pneumatic nails. My belt also contains a holster for the cordless drill.

The material kit for the closet should be ready and waiting. Material up to 6 feet long should be leaning against a wall away from other work areas, but longer material works best positioned strategically on the floor.

Closet basics. To install a shelf and pole, I mark the back wall of the closet 66 inches up from the floor. Then I measure the width of the closet and, with the tape measure still in hand, transfer that measurement to the back hook strip (back cleat) and shelf. After checking for square, I cut the hook slightly short with the cordless circ saw, using my foot for support. While holding it up to my mark on the back wall, I level it with my torpedo level and nail it off into studs, which is easy at this stage because the walls aren't painted yet.

Next, I measure, cut, and install the side hook strips (cleats), which cover any small gaps at the ends of the hook strip. Inside corners are often out of square, so before I cut the shelf, I check them with a 12-inch speed square. I then eyeball the needed adjustment and transfer it to the shelf.

Most of the simple closets we trim call for bypass doors with a track, valance, and bump jambs. I measure for those items while I have my tape out and cut them while I still have the cordless circular saw in my hand. The metal tracks are supplied slightly short, so they just screw into place. When I have my cordless drill in hand, I do all the screw work at once, including the pole supports, pole sockets, and track. The last step is to measure and cut the poles. I never try estimating or precutting poles before this point.

Walk-in closets. Most of today's master closets are really large — some are larger than my college studio apartment. When trimming those, we add a 4-foot level and a 3-foot ladder to our arsenal of tools. We precut as much material as possible at the miter saw, but a large, complicated closet is usually a series of small projects, where one step must precede another to get accurate measurements. The design for those complicated closets is spelled out in our mini-plans.

Figure 7. The small filler pieces needed to wrap bull-nosed corners are tough to nail safely, so they're temporarily held in place with hot-melt glue.

Window Stool and Apron

The standard window trim in our area is a simple stool and apron installed below an aluminum or vinyl window. The stool is notched to leave ears on each end and is trimmed with a small apron underneath, usually with 30-degree angled ends.

Window sticks. Cutting and fitting window trim efficiently calls for a pair of "window sticks," which are 2-foot lengths of 1/4x1 1/2-inch aluminum bar stock with a blunt chisel-like edge ground on one end. After we've used the chisel end of a stick to scrape any excess drywall mud away from the stool area, we tap the sticks into the gap between the window frame and the rough framing to create work supports that are used to lay out and cut

Figure 8. With the stool supported by aluminum window sticks, the blade of a combination square is aligned with the window return to transfer the required cut to the stool (A). The depth of the notch cut is then picked up with the square (B) and scribed onto the stool (C) before the notch is cut out with a cordless jigsaw.

the stool and apron (Figure 8). Aside from the window sticks, only a cordless jigsaw, a combination square, an angled template for the apron, and a pencil are needed.

With the stool supported in position by the sticks, I transfer the width of the opening to the stool with a combination square. I hold the square on the stool with the blade extended toward the window. I'm careful to hold everything steady. This method transfers the exact shape of the stool to the stock, whether it's square or not. Next, I pull the stock away from the window and put the head of the square on the wall and slide the blade until it hits the window frame. This shows me the depth of the notch. I lock the square and transfer the depth to the stool by sliding the head of the square along the inside edge of the stool with a pencil riding in the notch at the end of the blade. Finally, I trim the ears to $1\frac{1}{2}$ inches long and start on the apron.

The apron is the same length as the stool, so we simply transfer the length from the stool. We mark the angles on the back of the apron with a template made from the same material. For clean-looking cuts, the apron is then cut face down with a jigsaw and the stool is cut face up. We often notch many window stools at once and fasten them while the baseboard is installed.

Other trim options. Full window trim is not common in the production homes in our area, but when the plans call for it, we use a table saw to rip extension jambs to width. The only information I need for each window is height, width, and jamb width. The cutting list I generate goes from long to short and shows a destination for each piece. I get this information well ahead of our usual trim date because it lets me precut all my window pieces in the more controlled environment of my shop.

After cutting the jamb stock to manageable lengths using a stop system on the miter saw, I rip it to the correct

widths. The completed jamb extensions are bundled together with heavy rubber bands. This makes it easy to assemble them into frames on the job site, just before they're installed on the windows.

Crown Molding

We prefer to install crown molding after the mess from the standard trim package has been cleaned up. Although the speed and reliability of pneumatic finish nailers makes them our first choice for most trim work, this is one area where we opt for the hose-free convenience of cordless nailers instead.

We usually cut the material in position on a large miter saw, using a work station setup similar to the one we use for baseboard. The material is positioned upside down, with the fence representing the wall and the table representing the ceiling. This gives us the needed compound cut by moving just the miter table, without time-wasting bevel adjustments.

Around the room. Measuring for crown molding starts with the long walls. After two carpenters have pulled those measurements, one carpenter starts to cut the long pieces, while the other measures the shorter walls and lays out reference marks on the walls with a gauge block. When the molding has been cut to length, the carpenters position themselves on ladders at opposite ends of it. Once they've confirmed that the length is correct, the crown is tacked in position.

One carpenter then sets up at the end of the next piece and hands the material to the carpenter who has stayed in place. Continuing around the room this way ensures that only one carpenter moves at a time. While one is setting up for the next piece, the other is fastening. With one room complete, the cutting carpenter returns to the saw, while the remaining carpenter finishes nailing and sets up in the next room.

Base-over

Our last scheduled task is to install door hardware and the remaining baseboard over vinyl, tile, and hardwood flooring. This also involves a quality check of all our work and can take one carpenter up to a full day. A few days before the base-over, I check the house and get together with the superintendent to make sure we don't forget any loose ends. Our goal is to be 100% complete at this point. Making additional trips to finish up odds and ends after the final base-over is a time-waster that can put a big dent in overall productivity.

On to the Next House

Production home building involves doing a lot of tasks simultaneously. At any given time, we're installing exterior doors at the framing end, doors and millwork in the middle, and locksets at the finish end. A large part of my job is to juggle all of that and have contingency plans ready if something goes wrong. If a framing problem keeps us from installing exterior doors, for example, I try to have work installing doorknobs as backup. Backup tools and equipment are also important, so we always have things like spare saw blades, tape measures, and driver-blade assemblies for our pneumatic nailers on hand at the site. But I also have backup saws and compressors, and if necessary I can usually make it across town within a few hours to make a swap.

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