# Framing With The Plumber in Mind

## A few tips to help you keep your sticks and nails out of my way

by Peter Hemp

Contrary to what you might believe, most plumbers, including yours truly, do not enjoy chopping a house to pieces in order to get plumbing systems in place. However, I do claim ownership of a carborundum-tipped chainsaw for just this purpose.

When cost estimating, whether I'm on a job site or working from a set of blueprints, I first start looking for the amount of chop time that's necessary to get the rough plumbing in place. The more wood that I can leave untouched, the cheaper my labor bill is going to be.

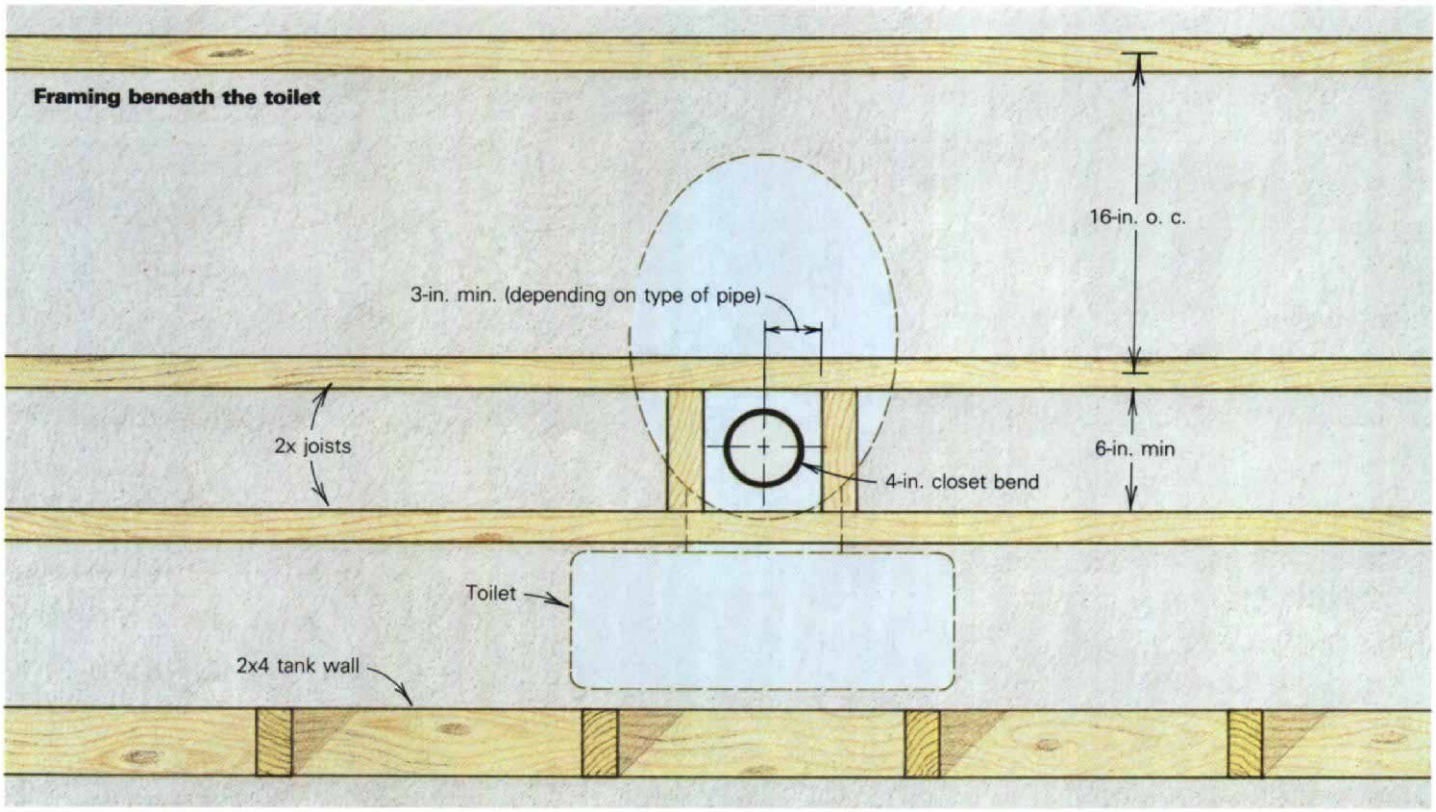
Many things will directly influence the labor cost of installing the rough plumbing, including the location of windows, medicine cabinets, let-in bracing, beams and the HVAC ductwork. But some of the most important factors are the direction and position of the floor joists and the availability of unobstructed pathways for vents.

Even minimal plan changes might need clearance from a higher authority, so I'd like to clue you in to those areas you can improve upon with little fuss, very little cost and all by yourself.

**Laying down the joists**—In the past, I have severed innumerable floor joists because they interfered with toilet wastes or tub and sink drains. Having done some time on framing crews myself, I remember how easy it was to lay joists from one end of the house to the other without thinking about the location of the walls until the subfloor was down. But in relation to plumbing costs, it's here that the greatest savings in labor (mine and yours) and the biggest gain in structural integrity can be realized.

On your next set of prints, look at the location of the bathroom wall behind the toilet. I call it the "tank wall." For standard toilets, the measurement from the finished wall surface to the center of the toilet drain (or closet bend) in the floor is usually 12 in. I like to use 13 in., which gives more clearance behind the tank for future paint jobs (drawing below). I'll need a minimum 3 in. of clearance around this center point to rough in ABS plumbing (about 3½ in. for no-hub cast-iron pipe). This allows room for the pipe (typically 4½ in. in diameter), plus the added hub diameter of the closet flange (for more on toilet installation, see *FHB* #46, pp. 54-57).

If there's a floor joist in that forbidden territory, I'm afraid it's recoil-starter time. When you plan to run joists 16 in. o. c. starting from the tank wall, center your first one about 8½ in. from the finished wall. You can then add a joist on the opposite side of the drain, again placing it at least 3 in. from the center, depending on the type of pipe used. Place an additional joist




Drawings: Vince Babak

wherever it's needed to satisfy the floor's structural needs.

If joists run perpendicular to the tank wall, I'll still need at least 3 in. of clearance around the center point of the closet flange. If there's a joist in the way, shift it over.

If you want to do a good deed for your customer after I've installed my drain, waste and vent system, and it has passed inspection, add some blocking around the closet drop. This blocking will stiffen the floor under the toilet, and that will help to prevent seepage from the toilet for the life of the structure. It will also save the owner lots of money later for the replacement of the subfloor and floor coverings.

Don't forget to take bathtubs into account when laying out the joists. Where joists run parallel to the length of the tub, I'd like a joist on either side of the drain hole, 6 in. from the center, with a block about 12 in. away from the shower-head (or valve) wall to support the pipe (drawing below). This distance will vary according to the type of tub and drain pipe, so check your tub before nailing up the block. When joists run perpendicular to the length of the tub, don't put a joist any closer than 12 in. to the valve wall if you can help it. If the toilet and shower head flank the same wall, you can't satisfy the requirements for both. In that case, leave a joist 8 ½ in. from the tank wall. I'll notch the top of the joist for the tub shoe (the drain fitting) if it's in the way and drill through the joist for the tub drain.

Again, you may have to add one or more joists to maintain proper joist spacing beneath the tub. But when you compare the cost of a couple extra joists to the cost of replacing a severed joist in not-so-perfect working conditions (how would *you* like crawling around in the dark over moist, unidentifiable objects?) you'll find the cost of the extra joists a real bargain.

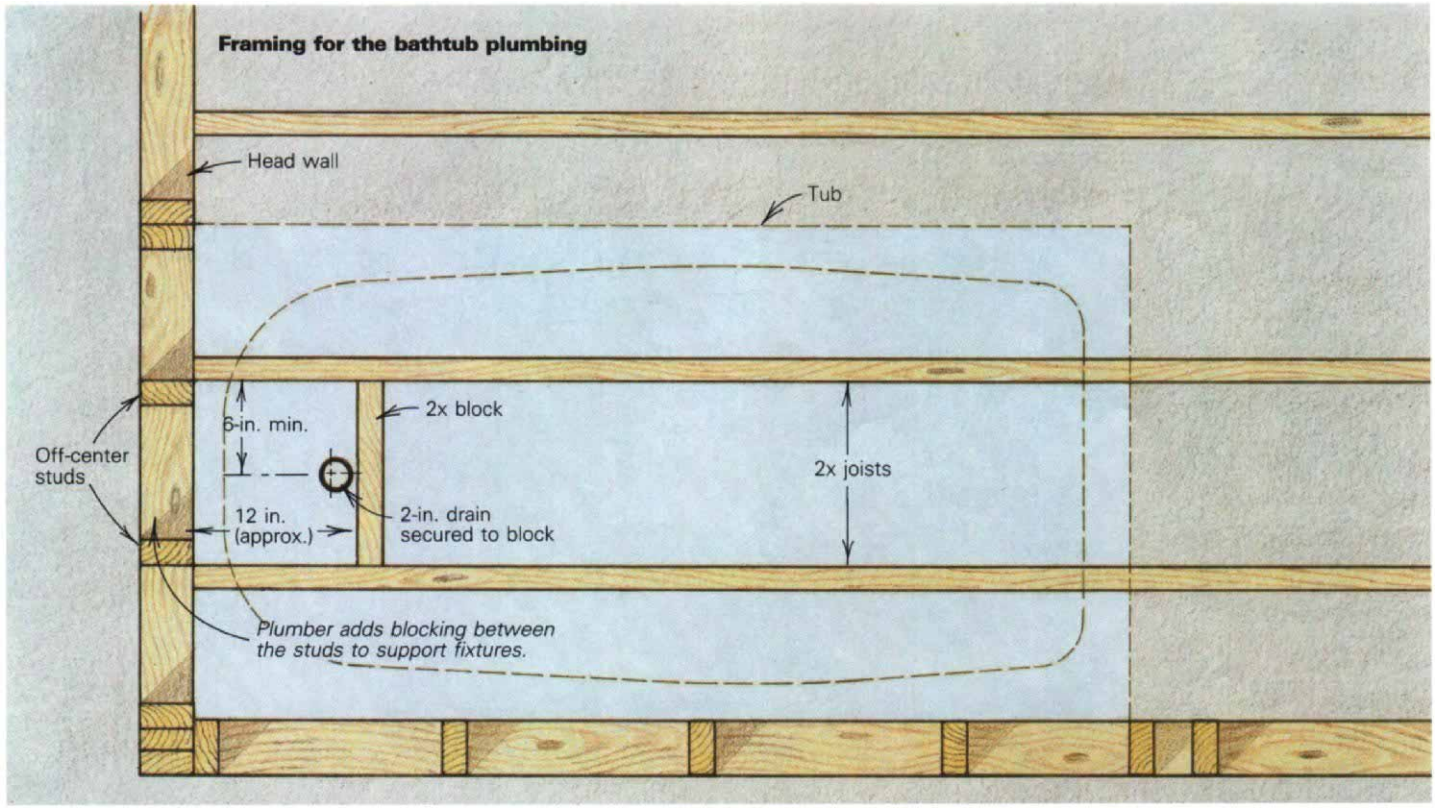
**Framing for tubs**—While we're on the subject of tubs, most residential tubs are between 30 and 32 in. wide. When carpenters frame the valve wall, they often put a stud about 16 in. from the adjoining wall. What a shame. How many times have you sat or stood in a tub and visually lined up the strainer in the bottom of the tub with the waste and overflow plate above it, the tub spout, the tub and shower valve and finally the shower arm and head? Did it bother you to see them all out of whack? Well, this all goes back to putting that stud in the middle of the valve wall. I have to carve up the stud to anchor my valve, spout and shower arm, and it never comes off looking professional.

Instead of that one stud in the center, please install two, dividing the width of the tub into three equal spaces. That way, I can add blocking between the two studs to anchor my plumbing fixtures. The blocking also makes it easy to line up the fixtures vertically.

**Troubles at the perimeter**—My final gripe about floor joists has to do with those lying beneath exterior 2x4 plumbing walls. When the joists run perpendicular to the plumbing wall, I have to contend with either a 2x rim joist or a rim joist with a row or two of 2x blocking. When the joists run parallel to the wall, I'll usually find a single joist toenailed to the mudsill.

When I have to bring 2-in. drain pipes (2½-in. O. D.) down through the bottom plate of the wall, the structure suffers. For the lines to stay completely inside the wall, (drywallers love you when they don't) I have to run a 2½-in. pipe through, at best, about a 2-in. space. If there's a fitting on the drain within the height of the joist, which is often the case, I need an additional ¼ in. to ⅜ in. of clearance. What does this mean? It means I have to remove ½ to ⅞ in. from the inside of the rim joist or block (if there's an inner block, I have to tear it out first). Worse, my drill makes a 2⅝-in. hole when it's sharp. When it's dull, it travels out-of-round and adds another ⅛ in. to that. So the joist or block can wind up being just ½ in. to 1 in. thick, give or take a few hairs. That's if my vertical cutting, done with the long rough-in blade in my reciprocating saw, is perfectly plumb, which it usually isn't. And that's before I chisel out between saw cuts.

You might be wondering why I don't use smaller pipes. If the same plumber who installed new pipes in a structure had to come back later to unclog them, there wouldn't be any drain lines smaller than 2 in. in a house. This happens to be my credo. Though our local building code calls for 1¼-in. drains for lavatories, 1½-in. drains for tubs and 2-in. drains for kitchens and laundries, I prefer to use 2-in. drains for all of them. If I do use a smaller diameter drain in a 2x4 wall, say 1½ in., it still means chewing away ¼ to ½-in of wood. I could reduce the diameter of the pipe by using DWV copper (which has half the wall thickness of supply-line copper) instead of ABS plastic or no-hub iron pipe, but



the cost of the copper pipe and fittings and of soldering the joints is considerable. Also, the torch I need for soldering could start a fire (if you don't think that plumbers are guilty of starting a few fires, think again).

So what is the remedy for all this? It's simple: furred walls. Nail 2x2s to the studs, and that extra 1⅝ in. will help me to stay clear of the rim joist or end blocks. You'll spend a few extra bucks for materials, but I'll bet in labor (yours and mine), furring the wall is cheaper than paying me to crawl and hack. And the structure of the house suffers less. If the rim joists parallel to the mudsill are doubled, which is sometimes the case, I'll still have to chew through the inner joist, but the furring will allow me to keep the outer joist intact. Of course, 2x6 walls would be even better than furring, or the designer can design the house to keep plumbing out of exterior walls in the first place.

**Nails in the plumbing zone**—A plumber spends most of his time boring holes. Unlike those "sparkies" who rarely have to drill any hole larger than a finger for their skinny little wires, we plumbers occasionally find ourselves boring 5-in. holes. And, the worst thing to encounter when boring big holes is a nail.

For fast drilling in wood, plumbers like to use self-feeding bits, which means we try to hang on to that powerful Milwaukee Hole Hawg, waiting to have it wrenched from our hands, pin our wrists, slap us in the face with the handle or spin us right off a ladder while the bit chews its own way through your masterwork. These drill bits can easily cost $25 or more and can be destroyed by nails the first day out of the box.

When I encounter a nail, I stop drilling immediately (as a safety feature, there is no trigger hold-down button on a Hawg; to have one would be suicide). I then have to remove the self-feed bit, replace it with a hole saw and continue drilling at a much slower rate, expending back-breaking energy. Now, if you were merely to stab your 16d sinkers a little differently, you would save me a lot of hassle and yourself some money.

Here's the program. Before you nail up a wall, consult your funny papers (some call 'em blueprints) to locate the plumbing fixtures. Next, mark the stud bays where the pipe is supposed to go, plus one bay on either side. Then, when you're nailing the bottom plates to the subfloor, start the nails in the middle of the marked bays, but don't sink them entirely. That way, if they interfere with my boring path, I can yank them out, move them over and set them myself. This also gives me the option of running the pipe through the adjacent bays if I have to. Do the same thing with the top plates; I'll sink all the nails when I'm through.

If the wall needs blocking, set the nails in the marked bays just enough to hold the blocks in place. I can bore the lower and upper plates, yank the blocks and bore them separately. Then I can slide them over my pipe (if there aren't any couplings in the way) and nail them in place myself. If the holes need to be bored near the ends of the blocks, the nails will usually split them. To avoid this, I use my cordless screw gun to predrill the blocks and screw them in place.

**Backing the drywall**—If you aren't asleep yet, hang on for the finale. My final suggestion deals with backing for the ceiling drywall. It used to be that a 1x6 was used for backing on top of a 2x4 wall, and a 1x8 backed a 2x6 wall. These days, two ceiling joists are often used instead, each slightly overlapping the opposite edges of the top plate (drawing below). This creates a U-channel, which can make it very tough for me to run my pipes.

If the plumbing wall is anywhere near the bottom slope of the roof, and the roof sheathing is already down, working in that location is almost impossible. The U-channel also makes it tough to tighten no-hub couplings, which are most often down in the channel. And there's more. Sometimes I try to avoid extra vents in the roof by back-venting several 2-in. vents into one 4-in. stack. The U-channels can end up getting so mauled that I have doubts as to their integrity.

On interior plumbing walls, I'd recommend using the 1x backing and avoiding center-span nailing in the plumbing bays. As I did for the plates and blocks, I'll finish the nailing for you after my pipe is through.

It may not be evident at first, but I think you'll find that my recommendations won't just save me labor, they'll save you some painful rehab activity that you would just as soon not experience. □

*Peter Hemp is a plumber and writer from Albany, Calif., and author of* The Straight Poop *(Ten Speed Press, P. O. Box 7123, Berkeley, Calif. 94707, 1986. $9.95, softcover; 176 pp.), a book on plumbing maintenance and repair.*

**Ceiling drywall backing**

*The method below allows the plumber easy access to tighten no-hub couplings and install back venting. In the method shown at right, ceiling joists complicate these operations.*