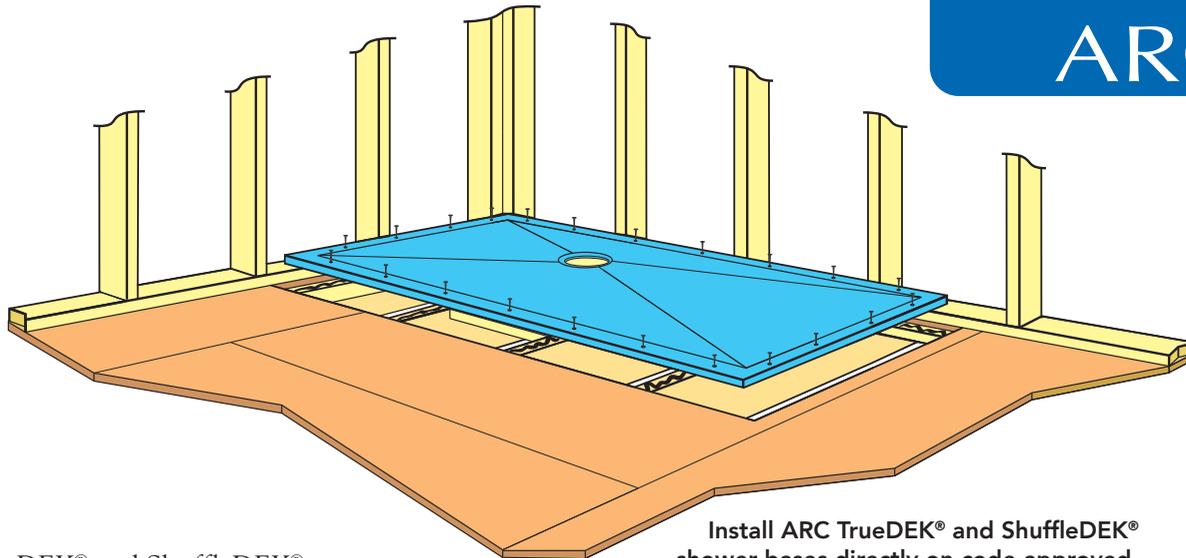


# Build Curbless Showers the Right Way

## What you need to Know about Risky, Unnecessary Joist Alterations

ARC inc.



Install ARC TrueDEK® and ShuffleDEK® shower bases directly on code-approved joists, without modifying the joists!

ARC TrueDEK® and ShuffleDEK® shower bases make it easy to build curbless showers while protecting builders from unnecessary exposure to errors, callbacks, and other profit-killing events. ARC bases are strong and thin for installation directly on joists while aligning flush with surrounding floor surfaces, which is ideal for building tiled curbless showers without the hassle, risk, and expense of modifying joists.

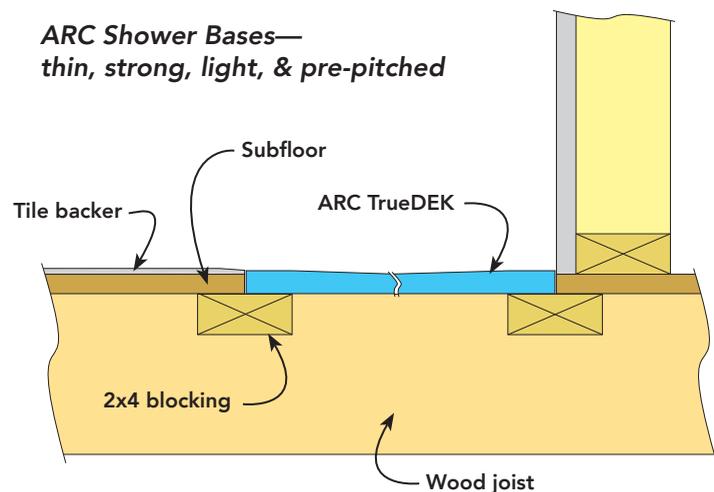
In new construction and in remodels, framing a floor for building curbless showers adds extra labor, time, and materials, and that means more cost and greater potential for error. Builders say that reframing joists for a curbless shower adds \$1,200.00 to \$1,600.00 to the cost of a bathroom remodeling project.

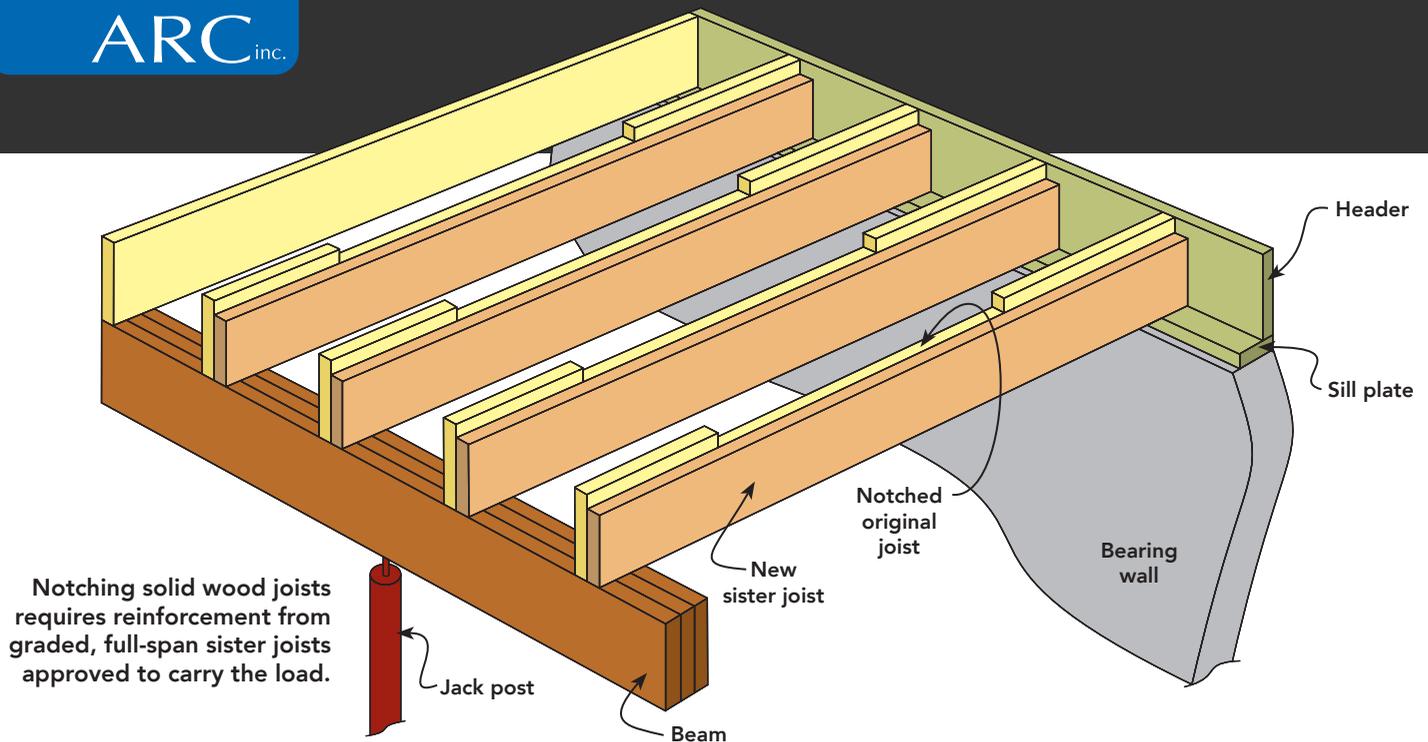
Like most things, the cost of modifying joists varies depending on many details, like the size, span, and condition of existing joists as well as the size, weight, and thickness of the shower base that the joists will support. For example, just imagine how heavy and thick a 5 ft. x 5 ft. mud bed shower base is. The weight of all that mud adds up to over 400 lbs., and it has to be supported by joists that may or may not have been originally specified to do that job. Knowing what you're doing is pretty important for anyone undertaking such a project. A TrueDEK base of the same size weighs 81 lbs.

Altering joists improperly can result in excessive bounce in the floor, which causes problems that appear over time: cracked tile and grout, tile coming loose, leaks, mold and mildew, and more.

With any ARC curbless shower base you avoid modifying joists and the potential pitfalls, and you save time and money by building a curbless shower the right way, and the easier way. Plus, you can achieve success without a lot of specialized experience.

On the following pages you'll find important information that you need to know before modifying joists for a curbless shower project.





## Modifying Solid Wood Joists

Here's a building inspector's advice on the correct way to notch and reinforce wood joists. This was published in *Fine Homebuilding* magazine (issue 232, Dec/Jan 2012). The answer is from Glenn Mathewson, former building code official in Westminster, CO, and now a professional speaker and educator on residential building codes. For more information on Glenn, go to his website at [www.buildingcollege.com](http://www.buildingcollege.com).

**QUESTION:** We want to do a barrier-free shower as part of a bathroom remodel, so we need to lower the floor framing in that room to provide the depth necessary for the tile installer to establish a sloped mud job leading to the drain. Span tables indicate that we can build the floor safely with 2x6 joists instead of the 2x8s that are in place right now. Is it okay to trim the top edge off the 2x8s as long as we don't go below the height of a 2x6?

**ANSWER:** Many new homes are built with lower-profile joists to achieve this effect, but that doesn't help much when it comes to remodels. In these situations, lots of builders take the approach you mention: cutting a few inches from the top of the existing joists.

The concern isn't catastrophic structural failure; it is excessive deflection. Joist spans are evaluated in two general capacities: shear and bending. Shear is what would cause the joist to break in half and the floor to collapse, an unlikely outcome unless the joist is extremely overspanned, overloaded, or heavily modified. Bending, however, is a more realistic concern, because it takes much less load to exceed the allowable deflection of a floor. In most cases, this results in a sagging, bouncy floor with cracked tile.

Lumber span tables are based on the assumption that the lumber has been graded, a process that includes evaluation of such factors as edge distance to knots, angle of grain, checks, splits, and decay. Therefore, structurally speaking, you can't rip a 2x8 into a 2x6 and then follow the 2x6 span tables. In fact, technically speaking, once you rip that 2x8, it is no longer an acceptable structural member at all.

If you do plan to rip down a wider joist, then you need a licensed professional engineer to perform the evaluation and supporting calculations to determine the loss of strength in the ripped member. That's a tall order, though, even for an engineer. The calculations of internal stresses in a wood member use values listed by species and — you guessed it — grade of material used. Then you're back to the same problem: modifying graded lumber.

What to do? Ultimately, if you don't take the "technically correct" opinion, you need enough information to do a risk assessment and to make your own assumptions. Some things to consider are the length and depth of the notch you plan to remove, the condition of the existing joist, an examination to determine whether they are underspanned to begin with, and the possibility of sistering full-width and full-length members to the trimmed joists.

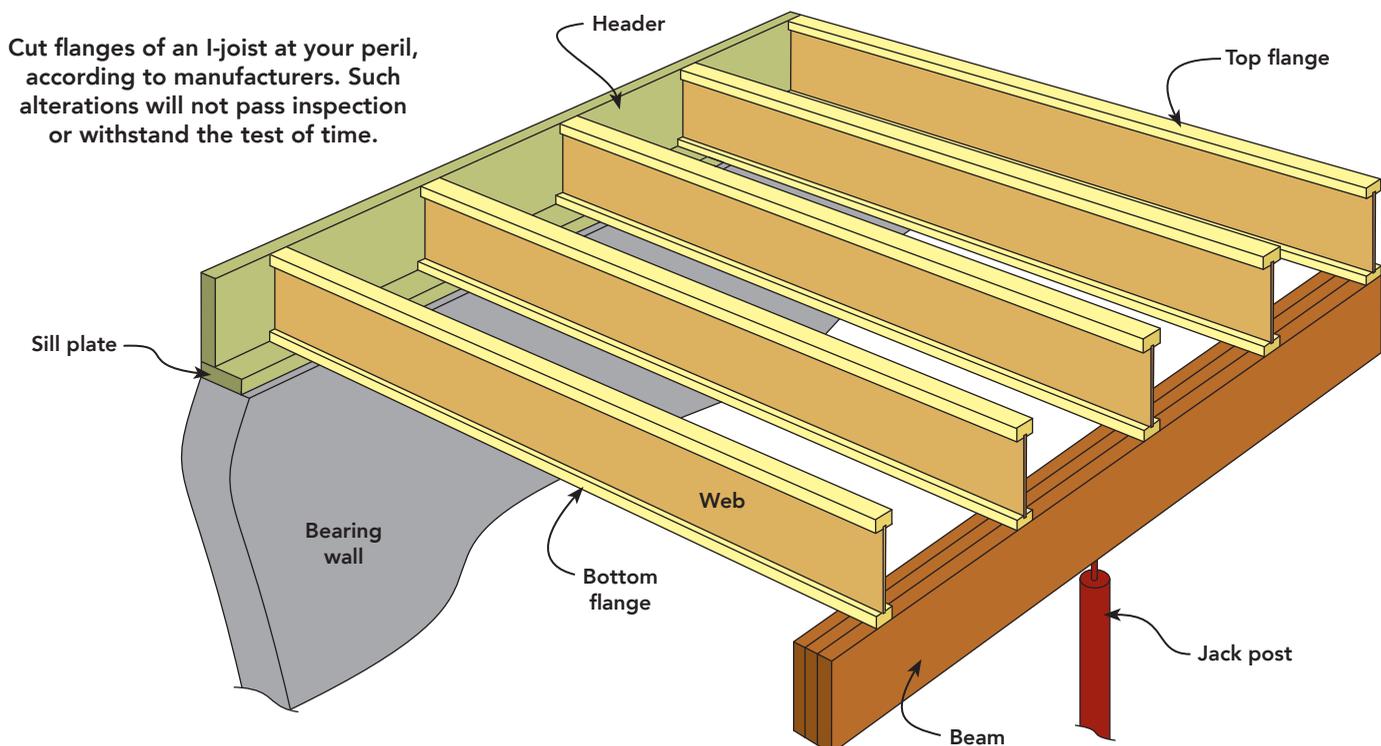
The solution I typically see and one that works well is to sister another lower-profile joist to the existing floor joists. When done correctly each end of the new joists must be supported by a bearing point (for instance, an existing beam or bearing wall). It also would be wise to install blocking between the joists in the area that will be altered. This ties the floor joists together so that they perform as more of a system, helping to take the bounce (deflection) out of the joists and to support their loss of bending resistance from the modification.

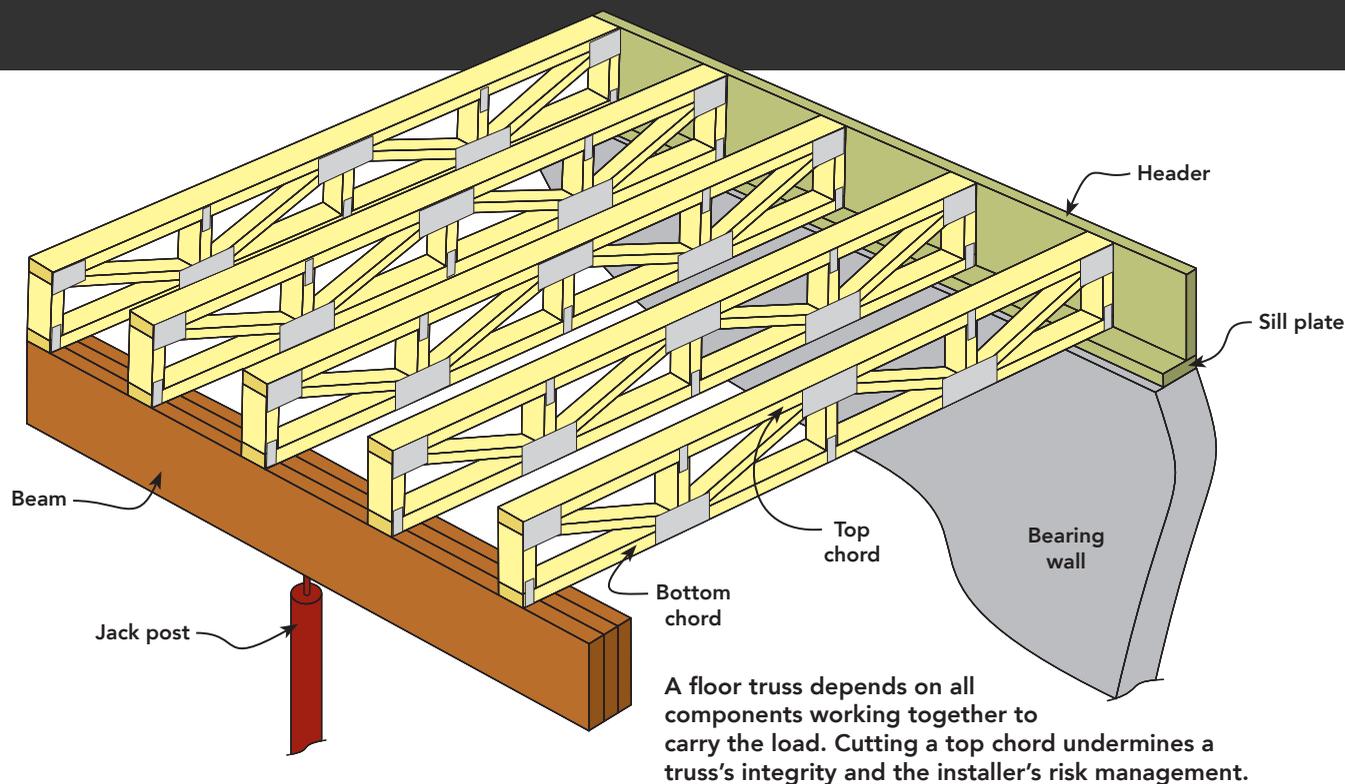
## Modifying Engineered Wood Joists

Homes built for the past 25 years or so are mostly constructed without solid wood joists. To replace solid wood joists, engineered products like I-joists and floor trusses were developed which reduce the amount of wood consumed and take advantage of wood waste and less desirable cuts. When it comes to remodeling bathrooms for curbless showers, however, altering I-joists and floor trusses is much more restrictive than solid wood joists.

Cutting the flange of an I-joist is a big no-no and inspectors will not give a pass to this practice. Here's what Weyerhaeuser, manufacturer of the TrusJoist® product line, has to say in their brochure: "The flange of a TJI® joist should never be deliberately cut or notched and TJI® joists subject to damage prior to installation should be discarded and replaced."

If cutting a top flange severely compromises an I-joist, what kind of recklessness would it take to cut the top flange of four or five I-joists in a row for lowering a shower floor?





Floor trusses are engineered to work as a complete unit and are specified for precise applications, therefore they do not allow for any alterations. Cut into the top chord of a truss for a curbless shower and you're asking for trouble.

The only way to lower an I-joist or floor truss system for a curbless shower is to replace the original joists in the shower area with lower profile joists that accommodate the step-down requirements for the shower base (the step-down amount, plus the type and number of replacement joists, depend on the thickness of the base, its size, and its weight). Of course, just like with solid wood joists, replacing I-joists or floor trusses means exposing all bearing points – new joists have to rest on beams or bearing walls just like the original joists do. That's an awful lot of floor to remove to access underlying joists and bearing points for a complete makeover.

## Choose a Better Way

The solution to all this expensive extra work and risk is to avoid it. Instead, use a shower base product designed specially for curbless showers. Don't inherit old ways of construction just because it's the way it's been done! Those methods just aren't the best for building curbless showers.

ARC's TrueDEK and ShuffleDEK shower systems not only bypass the shortfalls of lowering or notching joists, they also save significant amounts of installation time, make project success accessible to a wider range of skill-levels, and limit an installer's financial responsibility. When you think about the labor savings, the faster start-to-finish times, huge decreases in risks and mistakes and callbacks, and the insurance benefits, there really isn't any argument left to keep from making the switch to the best option available.

Build a curbless, level-entry shower the right way and it will last a lifetime. And you won't risk any aspect of a home's structural integrity or longevity. ARC shower systems give builders a better choice to deliver what homeowners want, and to do it faster, easier, and with superior results.