Retrofit Options

Definitions

Structural Timber System – Timber system is engineered to carry load greater than its own weight. (ex.: floor load, roof load, etc.)
Non-Structural Timber System – Timber system is not engineered to carry any load.
Conventionally Raised Timber System – Timber system that is raised before a structure is enclosed.
Retrofit Raised Timber System – Timber system that is raised after a structure is enclosed.

When to decide - Retrofit vs. Conventional Raising

The earlier you plan for your timber system, the better off you will be. A Conventionally Raised Timber system will have greater design flexibility and tighter joinery at a lower cost than the same system raised as a retrofit. The best time to plan your timber system is when your structure is being designed. Some design considerations to keep in mind are species selection, weight limitations, and the complex nature of hips and valleys. A designer or architect can plan ahead for a better looking timber system, while also saving you money and possible headaches. If you are already past the point of original design or you have purchased a set of stock plans that do not accommodate your timber system, it is not too late. Our design staff can draw a set of timber plans to fit your structure. Even if you have already begun construction, it is still not too late. As long as the roof of your structure is not yet framed, a conventionally raised timber system is still an option for you. Realize that there will be lead time for your custom timber system. The further ahead you can plan your timber system, the less chance you will have of delaying your construction process.

Going with a Retrofit?

Typically if your structure is already built and you want to add a timber system, your timber system was an afterthought. That is Okay. You can still have a beautiful timber system. But, you must now realize the possibility that your original structure's design may not have been intended to suspend additional load. Attaching timbers to the underside of a ceiling can look very attractive, but these timbers can be very heavy. These additional loading needs to be reviewed to assure proper load paths exist to resist them. You now have two options.

Option A: Harmony Timberworks will provide you a precut timber system and general information on load transfer into your existing structure. It will be necessary for you to procure proper connection instructions and an adequacy assessment of your existing structure from your own architect/engineer.

Option B: In addition to providing you with a precut timber system, Harmony Timberworks can have your structural plans assessed for adequacy and provide attachment details prescribed and stamped by our engineer. The engineer will review any necessitated blocking, corbels, or

posts for adequate load transfer, dimension, material, location, fastener type, length, quantity, placement, etc. Note this engineering review is in no way a whole house engineering review and will not make our engineer your structural engineer of record for the structure.

Expectations of a Retrofit

Raising your timber system as a retrofit may accentuate any imperfections that occurred during the building process of the existing structure. Any variation in room spans, wall planes, roof planes, and/or pitches can cause gapping in a retrofit timber system. Also, without typical conventionally raised timber joinery to resist wood's natural movement during the drying process, a retrofit timber system can gap over time. Caulking, puttying, and trim work are possible options to conceal these imperfections.

It is suggested that on any retrofit system, representatives from Harmony Timberworks come to your site to do an analysis of the project and pull field measurements on a fee basis. Your construction team may not be fully aware of the intricate information needed by our design staff in order to prepare a system model. A visit from our crew can assure that all necessary information is acquired.

Sufficiently connecting retrofit timbers to an existing structure is important. Installation of blocking (see "Blocking" section) will typically need to be installed prior to timber delivery. Allow for this additional material and labor in your construction schedule. Typically, the raising sequence for a retrofit roof system is to first rigidly attach the timber rafters to the existing structure, then to hang the remaining timbers individually from the timber rafters. As noted above, connection details to existing structure will only be provided by Harmony Timberworks if you choose for us to have your structural plans reviewed by our engineer.

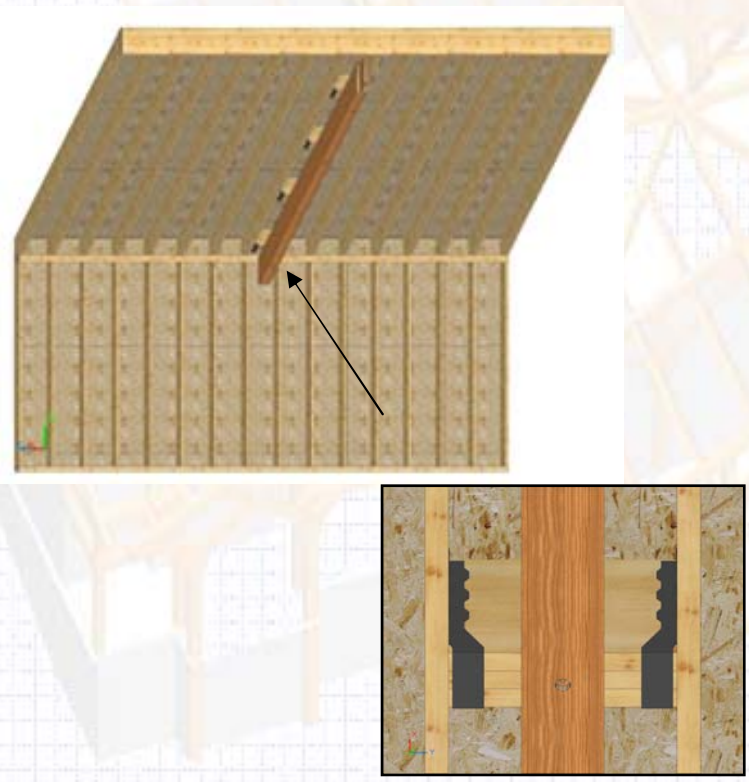
The raising process of a retrofit will go much slower than that of a conventionally raised timber system. With a retrofit, pre-assembly and craning in of the timbers is not possible. Most likely, each timber will have to be raised individually by hand. This may not be easy. Example: A 6"x10"x16' Douglas fir timber will weigh approximately 320 pounds. The estimated weight of your timber system components will be noted on your Harmony Timberworks timber plans.

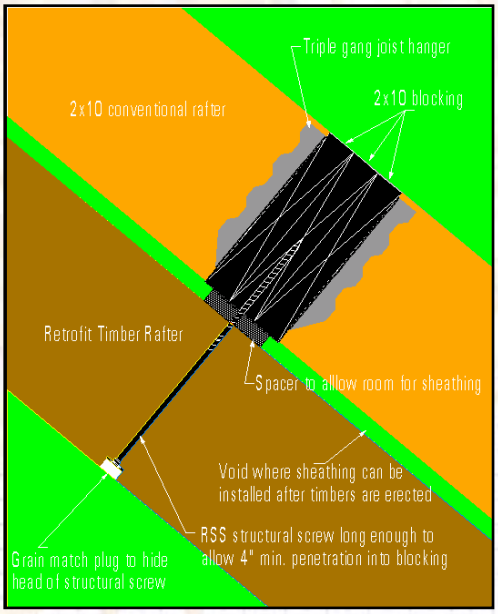
Blocking

Blocking is a term used to describe the addition of wood pieces, typically between two rafters or two floor joists. This blocking is used as an attachment point and as a means to transfer additional timber load into the members of your structure. It is critical that once your blocking has been installed, the installer of the timber system must be able to locate them. The easiest way to do so is to not install the interior room finish (ex.: drywall, decking, etc...) until after the timbers are installed. Connection suggestions can be found in the "Retrofit Detail Drawings" section below. As noted above, connection details to existing structure will only be provided by Harmony Timberworks if you choose for us to have your structural plans reviewed by our engineer.

Retrofit Detail Drawings

Blocking Example

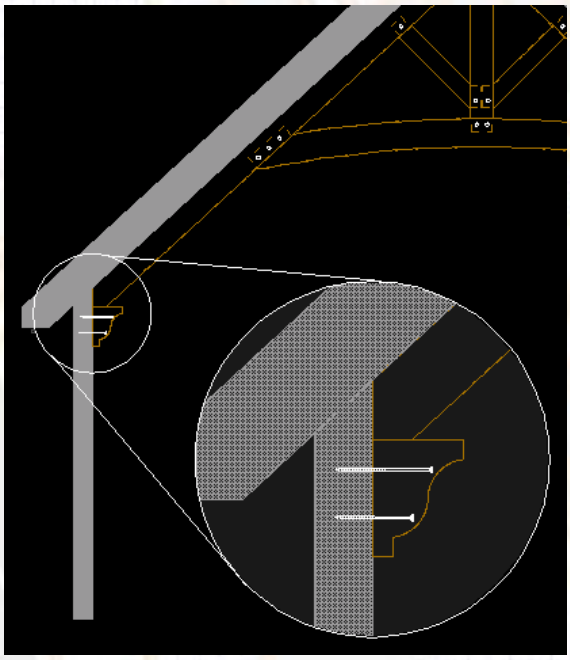




Viewed from below

The above examples show how a retrofit rafter may be hung from a conventionally framed roof system. The example uses a triple gang joist hanger to hang three laminated 2x10 pieces of blocking between two 2x10 conventional rafters. A small spacer is then attached to the blocking to allow room for sheathing installation later. This blocking would typically be needed a minimum of every three feet and at each end along the length of the member being suspended. The timber rafter would then be attached to the blocking with structural screws. The screws would then be plugged and the connection is completed. After the retrofit timber system is installed, the sheathing (ex.: drywall, decking, etc.) may be installed. This is an example. Do not assume this connection is adequate for your retrofit. See "Going with a Retrofit?" above for your options.

Trim Solution To Existing Structure Imperfections



A

B

The two above examples (right) show how when a straight retrofit timber was suspended from a wavy ceiling (A), a gap occurred along a portion of the timber. This gap can be left as it is or can be hidden with trim (B).

Corbel Example

The above example (left) shows how the load of a retrofit truss can be redirected to bear on a corbel that is attached to the wall of an existing structure. Anytime load can be redirected into a wall or post instead of a roof or floor structure, it is safer. When you add large amounts of weight to a floor or roof, deflection and spreading is more likely. In this example, it is likely that the retrofit truss would still need to be attached to the roof, but mainly for stability and not for support. Note, a corbel, just like any other connection between your existing structure and timber, must be reviewed by an engineer for adequacy. See "Going with a Retrofit?" above for your options.

Whether you are able to build a conventionally raised timber frame or need to go with a retrofit timber system, be assured you can and will end up with a beautiful timber system if you plan ahead. Now, let's get started!