

# TIMBER FRAMING

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# Restoration Strategies



Photos Jan Lewandoski

Above, the spire of the Castleton Federated Church, Castleton, Vermont (1832), removed from the church. A hole in the ground made way for the internal mast and allowed the spire to be lowered to a convenient working height (below). The original mast had rotted from the top; the new one, a 50-ft. hickory 9x9, lies on blocking at far left above. The mast, unfooted, hangs in the spire, exerting considerable compression on the steep rafters attached near its top, and may also resist wind forces.



IN the restoration of historic timber frames our goal should be to retain the maximum amount of historic fabric while making the frame structurally sound. The desire and tendency to replace cracked, discolored, partially rotted but structurally adequate framing members with shiny new stuff must be resisted in the framer as well as the architect or owner. In fact, framers and carpenters are frequently the worst offenders when it comes to replacing more timber than is necessary in an old structure, and for several reasons: it is frequently easier and cheaper to replace than to repair; a replacement timber is likely stronger than a timber repair, causing the framer, building inspectors and engineers less worry in the long run; and new framing shows off the contemporary framer's skills while repair of old framing ideally down-plays your new work while emphasizing the original. Keep in mind that when you are asked to work on an historic church, courthouse, barn or house, or at a museum, it is not because the owners or curators wish they had a new timber frame instead, but because they feel there is an inherent virtue to continuing to be in the presence of the old materials and craftsmanship and they assume you feel the same way.

This principle should guide you, but there are also situations where vast amounts of repair work would detract from the feeling of substance and the integrity of design that we hope to retain, or would make the structure incapable of carrying its historic loads. In these cases the faithful replacement-in-kind of damaged timbers is preferable. There is no one correct way to restore historic frames, but rather different strategies that take into account the use and function of the structure, the importance of surrounding historic elements such as plaster or painted finishes and the comparative antiquity or rarity of any frame member.

USE. Replacement of a timber in its entirety is called for if a member is totally rotten, broken at the middle of a heavily loaded span or positioned in a structure such as a wooden bridge or church steeple where very heavy live or dead loads are expected. The vertical members of a steeple frame and almost everything in a truss (except perhaps some compression

shoulders at the chord ends) are candidates for complete replacement. Barn tie beams that are rotted may have a new section scarfed in and possibly a tie rod placed alongside them to resist tension. If, however, this tie beam is subject to substantial bending caused by purlin-post loads, it may have to be replaced in its entirety. Before replacing anything examine the framing to see if original posts, studs or braces have been removed that, if put back again, would adequately support the damaged member and allow for a partial repair.

If a barn floor system will have to carry tractors, horses and cattle or tons of hay, all its weak joists may have to be replaced. If a barn at a museum will never be heavily loaded again, but merely viewed from below as an example of old work, you and the owner may decide to leave members in place that will support persons if necessary, but no heavier loads.

Over the past century several different strategies have been in use by preservation professionals when restoring framing. The earliest, and least favored today, is the replacement of bad old timbers with good old timbers from other buildings. While avoiding the look of newness, this technique muddies the historical record and is seldom very convincing to the experienced eye.

An over-reaction to this in the 1960s and 1970s stressed the use of contemporary materials, for example, splicing in nailed-together dimension lumber and sticking aluminum studs into a frame. This resulted in the creation of confusing spaces that conveyed no feeling of the past.

The philosophy I favor may be called "preservation of design" and attempts to approximate normal maintenance of a structure *in the style of its original builders*. If timber is to be replaced I attempt to match



Sill and brace restoration by Paul Ide and Don Estes. Note jacking plate on corner post. Foundation to be restored. Kent Barn (1844), Calais, Vermont.



Above and below, work at the Theron Boyd house, built 1787 at Quechee, Vermont, and now owned by the state, called for preservation undisturbed of the original interior. Most repairs were thus carried out from the exterior. Shown here are new beech sills joined to the old and a glimpse of the interior. The jacking plate in the photo above is bolted to every post and stud.



species, joinery and surface (adzed, broadaxed, vertically-sawn, hand-planed, painted). However, the timber is not to be stained to look old or artificially distressed to approximate wear. The present date should be carved or stamped at some place on the timber. If there seems to have been a problem of inadequate strength in the old framing, or heavier loads are about to be imposed upon it, I will shift to stronger species and slightly-increased dimensions in the hope of solving the problem without materially changing the "feel" of the space.

**SURROUNDING HISTORIC ELEMENTS.** Frequently the timber frame is just one part of the historic fabric to be preserved in a structure. The framer's pre-

ferred method for replacing the rotted top of a post in a house frame may be to expose the post, cut it back to good wood, and use a long scarf with pins, keys or wedges to join a new length of solid timber. If, however, that post protrudes into a room and is cased with boards with one 1785 coat of paint on them, and surrounded by the original plaster, the value of leaving the interior surface undisturbed could

mandate repairing the post from above or from the exterior side using lag-screwed blocks of wood or the sort of plugging that resembles a dental filling, or reinforced epoxy.

Stone foundations have been traditionally the most abused elements during historic restorations, casually being removed and replaced with concrete or stone veneers while extensive patient work is given to the woodwork above it. The best form of sill replacement involves bringing a new sill up from below onto the tenons of the posts and studs. This involves dismantling the foundation in the affected area. If disturbing the foundation is undesirable because its condition is good and its assembly very complicated, it may be necessary to bring the sill in horizontally with slots rather than mortises for the posts and studs. These slots can later be plugged from behind, a solution not so good as full mortises but a reasonable compromise.

**ANTIQUITY AND RARITY.** The only check on the faithfulness of our restorations to the actual past is comparison with surviving early work. Consequently, the fewer examples that survive of a type of construction or style of building, the more elaborate should be our attempts to preserve its actual fabric *in situ*. What is rare depends upon where you are. Seventeenth-century dwellings or barns are common in England but rare in New England. I would be reluctant to change a complete stick of timber in any 17th-century New England frame unless there were others like it in the building. For example, if there were six identical rafter pairs, hewn with mortised collars, and one pair was extensively rotted, I would consider replacing that pair. On the other hand, a summer beam in the principal parlor would qualify for exceptional means such as letting in of concealed steel reinforcement or numerous wooden plugs, or hanging by rods



New hewn gable plate with free tenons fitted to post and eave plate, preserving most fabric. Bean barn (c. 1820), Barnet, Vermont.

from a truss in a partition above in order to preserve its presence and the information it conveys. While it may be possible to reproduce the size, species and joinery of the summer, other information such as how much wane the chamfers are allowed to run in and out of, or the sort of hewing found acceptable as a finished appearance, will always be impossible to duplicate exactly. In contrast, a typical 19th-century barn might better be interpreted to the public with all its damaged members replaced, and seen in use as a working structure rather than as an artifact or ruin.

—JAN LEWANDOSKI



New cedar posts and braces under the Hadsell barn (c. 1860), St. Johnsbury, Vermont, a fully-functional repair.