

## 12.0

### Impediments to the Installation of Horizontal Braces

Do not get discouraged if you cannot install a retrofit stud every place one is required. The methods suggested in this section and the preceding one have workarounds for installation of most of the necessary retrofit studs or provide an alternative means of achieving the strengthening you are seeking.

**Truss Webs - Can't place a retrofit stud against an existing stud:** The most common problem you may see in your attic is where the gable end truss has built-in webs. They prevent retrofit studs from being fastened directly to them. Not to worry. There are two work arounds. One involves just notching the retrofit stud where webs are in the way which requires using a deeper retrofit stud. So, if a 2x4 retrofit stud was required, then notch a 2x6 retrofit stud the 1-1/2" so the retrofit stud can be placed against the wall. Likewise if a 2x6 is required, use a 2x8; if 2x8, use 2x10. Then fasten the retrofit and existing stud in the usual manner recognizing that perhaps there will not be the full complement of fasteners as there would have been if the truss did not have webs.

The other work around is done by placing the retrofit stud against the outside of the existing stud. Then fasten nail plates to connect the two studs together. This is simple and does not require cutting notches. This nail plate method requires more fasteners. The requirements for attaching the nail plates and their spacing along the studs are indicated on Figure C104.3. Acceptable Simpson tie plates include TP37 and all that are wider or longer than the TP37. Acceptable USP mending plates include NP37 and all that are wider or longer than the NP37. The longer they are the easier they are to install.

**Single missed retrofit stud:** The way to compensate for a missing retrofit stud is to make the retrofit studs on each side stronger, and install 2x4s horizontally between them that are spaced 12" apart vertically. The horizontal 2x4s are secured using h-ties at their ends to the retrofit studs and to the missed existing stud. See Figures A – 13 and A – 14 in the Appendix. The shape is not unlike a ladder. This solution is limited to a single missed retrofit stud and there must be at least two successfully installed retrofit studs between any missed retrofit studs. This prevents doubling up the loading on a single retrofit stud, albeit a larger one than normally required. It is certainly possible to increase member sizes and span greater distances, but the engineering has not been worked out and it is expected to be fairly rare that the solutions presented here cannot be made to work.



**Figure 12.1.** These show nail (nail, tie, mending) plates along the lengths of the retrofit and existing studs to bridge around webs on the truss.

**Splicing retrofit studs or Can't get long enough retrofit studs into attic:** When retrofit studs need to be spliced the method shown in Figure A - 12 in Appendix A can be used. Notice that this method requires 54 fasteners to secure the splice member. It might be easier to make more effort to fish a sufficiently long retrofit stud into the attic to prevent the need for a splice. By using patience one can get much longer studs into the attic than one would suppose or at first think possible.

***Retrofit studs longer than Table 1 allows:*** Gable ends higher than 16' most likely are made of two trusses with one over another. Such trusses are called **piggy back**

**trusses** with each member not being much higher than 8'. Such high trusses should be evaluated by an engineer to determine retrofit measures. The engineer might regard the two trusses as separate entities and call for retrofitting them individually while providing additional measures where the two meet by extending horizontal braces into the interior. Photographs of the gable end will help the engineer understand the gable end situation before the engineer visits the attic.

***Retrofit studs that need to be notched:*** If there are obstructions such as diagonal truss webs or pipes running horizontally, then the studs can be notched around them. It is critical that the retrofit stud is left with enough depth at the notch that it meets the depth requirement of **row number 3 in Table 1**.

***No apparent solution?*** If none of the methods described above work in your situation it is advised that you have a structural engineer develop a solution.