

4.0

Collecting Information from the Attic (Making *Gable End Sketches*)

You need to collect information from the attic about each of the two retrofit activities, namely strengthening and bracing each gable end wall and strengthening the wall-to-wall connections. With that information, you can decide on the methods to be used, make a plan and develop a shopping list of materials.

You will need to know the number of studs at each gable end that are 3' or longer. Existing studs less than 3' do not need to be retrofitted because existing connections and strengths are probably already sufficient. In addition, you will need to know within a couple of inches the lengths of the studs that are longer than 3'. Lastly, you will need to look around to determine if there are obstacles that prevent or make installation of horizontal braces difficult or impossible, and you will need to determine if there is anything that prevents installing retrofit studs against the wall sheathing and against the edge of existing gable end studs. To save time and reduce the number of trips into the attic, you should record those observations on paper and with a digital camera. There may be so many details that they are difficult to remember and some may need to be considered in 3D.

How to decide whether to use L-bent or U-bent straps: Based on the information you collect in the attic and from the suggested reading below, you can decide on which of the two strap methods to use. Before going into the attic to collect information, it is suggested that you read this section and **Sections 6, 7, 11 and 12**. However, you only need to read Sections 11 and 12 if you find an impediment that prevents using the straightforward retrofit measures discussed in **Sections 6 and 7**. Once you have determined the exposure category and basic design wind speed and collected the information from the attic, you should next turn to **Section 5** for guidance in selecting the sizes of lumber and the number and types of fasteners plus some other necessary and helpful information. **Section 6 and 7** give step-by-step instructions for doing an L-bent or U-bent strap retrofit, respectively. **Sections 10 and 11** suggest ways for dealing with unusual cases or things that may be in the way. **Section 12** gives detailed instructions for strengthening the wall-to-wall connections. The reason for reading these other sections is that in almost every house, there will be something that requires adapting or altering the straightforward procedures detailed in **Sections 6 and 7**. This guide has anticipated many of these situations and provides work arounds for them. These 'little somethings' can be obstructions that prevent following procedures in **Section 6 or 7** for installing horizontal braces on the floor of the attic or installation of retrofit studs at the gable end. The workarounds are presented in the two sections that deal with impediments, **Sections 9 and 10**. The reason for reading or scanning all these sections before going into the attic is so you will have some ideas ahead of time of things to look for and for possible workarounds.

To make collecting information easy, several documents are included to minimize the number of trips that you will have to make into the attic. They can be found in **Section 17**. They include the *Attic Inspection Checklist*, a blank *Gable End Sketch & Worksheet* page for you to record your observations; and some blank *Sample Gable End Sketch & Worksheets*. A helpful document for collecting information about wall-to-wall connections is the *Wall-to-Wall Connection Details*. Notice that at the top of the *Attic Inspection Checklist* there is a list of things to take into the attic. Be advised that there is so much to observe that good notes will reduce the number of trips that you have to make into the attic. Also, take lots of digital photos, if possible. Still, as good as photographs can be, you may find yourself in the attic several times to gather information. Multiple trips may be necessary particularly if there is an unusual detail that needs a work around. Straightforward retrofits are by far most typical and are very easy to gather information about...mainly just the retrofit stud length.

General description of what you will do in the attic: At this point we suggest that you print out the *Attic Inspection Checklist*, the *Sample Gable End Sketch & Worksheet* page and several blank *Gable End Sketch & Worksheets*. The *Attic Inspection Checklist* includes instructions for making inspections. We suggest you read the *Attic Inspection Checklist* before you go into the attic so you have a good idea of the details for which you will be looking. Reading the checklist twice may be beneficial. Do not rely on your memory. Taking good notes and pictures can save you some trips into the attic. In the middle of the left side of the Sketch Page is a brief reminder checklist of observations for you to make and record.

You can make markings on the gable end triangle of the sketch or you can enter data in columns 2, 3 and 4. The advantage of entering data on the table is that the sketch will become less cluttered.

- In column 2 indicate the side of the existing stud where retrofit studs can be placed. Do this by writing in L, or R or LR, where LR means both sides work.
- In column 3 write in the lengths of studs.
- In column 4 indicate if you think you want to use L-bent straps or U-bent straps. Remember you can use either at either end. So if you choose to use L-bent at the bottom and U-bent at the top you might write L/U. Or if you will just use L-bent at both the top and bottom, write in L. Try to use L-bent on the attic floor. For the upper retrofits you can use L- or U-bent, but you will almost always use U-bent when the gable end has an overhang supported by outriggers that extend from within the attic out over the gable end wall to the overhang. The rest of the columns will be filled in later.

As you look at each retrofit stud location you need to decide if you will use the L-bent strap method or the U-bent method. You can use L-bent straps at the bottom by first installing the bottom horizontal brace, adding an L-bent strap to the bottom of the retrofit stud, setting a U-bent strap at the top of the retrofit stud and then fastening the retrofit stud to the existing one. Next, and finally, the top horizontal brace is butted to the top of the retrofit stud and fastened to the roof framing. Don't forget the compression blocks

on the bottom horizontal braces. On this first reading these details may have left you behind; not to worry. As you read on you will better understand what is said here.

A 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. A simple solution is described in **Section 16** where the use of nail plates is described. Briefly, because retrofit studs cannot be placed overlapping existing studs, they are instead placed just outside existing studs where steel nail plates are used to connect the two studs together.

In some instances the wall studs may continue without a break from the floor below up to the roof. This type of framing is known as **balloon framing** and is it one of the best ways to make a very strong gable end wall. If you find balloon framing, what you see in the attic will not match any of the drawings in this guide and you probably do not need to retrofit your gable end except to check the connection of the wall framing to the roof framing. In addition, you still definitely need to evaluate the attachment of overhangs to the gable end wall or truss. When the gable overhang is more than a foot, this is one of the most critical, if not *the* most critical part of gable ends. If the overhang is two feet or more, then attachment is even more critical. Overhangs are addressed in the the Roofs section of the web based retrofit guide. The masonry analog to balloon framing is where the masonry wall below extends all the way up to the roof. Again, if you find this situation, it will not match any of the figures in this guide and you probably do not need to retrofit your gable end, **but** you definitely need to evaluate the overhang as discussed above.

Check every gable end: Every gable end should be evaluated for retrofitting because each may have some differences that will affect how you retrofit. You may be surprised to see the differences in construction methods at one of your gable ends compared to another. You may find one truss gable ends as well as conventionally framed ones. What you are looking for at each gable end are obstructions that might alter the way horizontal braces or retrofit studs can be installed. Good notes and lots of photos will reduce the likelihood of repeated trips.

Check every potential retrofit stud location: Because nearly all houses have something in the attic or a construction detail that prevents retrofitting using straightforward methods, you will want to know how to deal with odd situations. Hopefully, the workarounds presented in this guide will cover nearly every condition you find.

If you have read Sections **6** and **7**, printed the suggested pages and gathered the tools you will need in the attic, you are now ready to make a trip into the attic and collect the information on each gable end to be retrofitted. With the information you collect in the attic and the information that you collected from the building department, you will be set to make a worksheet that includes a sketch of each gable end, develop a list of materials and estimate the cost.