Run vs Effective Run

By Joseph Fusco

When I first learned how to frame roofs I was shown that the overhang was measured to the tail cut of the common rafter. If you had a 12" overhang you cut the tail at 12" from the building plumb cut line and that was it. This approach didn't take any of the other components into account and your *overall* overhang would actually be different then 1'. If you had ½ sheathing that reduced the overhang by ½" or if you had a sub fascia of 2x stock your overhang would then grow, add a finish fascia and it would grow still more. If you then didn't account for a finish on the building, the overhang would then decrease by the amount of the finishing material on the house. I'm sorry to say that in my earlier days those differences didn't really seem to bother the guys in charge, that's just the way they had always done it. It didn't take me long to figure out that those differences where indeed important and that they needed to be accounted for when calculating the rafter length and it's overhang.

On every roof there are two important measurements. One being the measurement, measured horizontally from the center of the ridge to the building plumb line, commonly referred to as the "run". The second being the measurement from the building plumb line to the end of the "finished fascia" measured horizontally, this is called the "overhang". To further understand the "run" is to know that it is also ½ of the "building span" which refers to the measurement from the outside edge of the rafter plate to the outside edge of the opposite rafter plate measured perpendicularly to those plates, across the shortest distance of the roof. The *outside edge* refers to the edge before any sheathing is applied to it. Typically the roof is framed before any sheathing is applied. That edge is referred to as building plumb line *(See fig1).* When roof framing you hear these terms often in the discussions on calculating the unit rise, unit length and pitch angle for common, hip and valley rafters.

The "run" is calculated from the center line of the ridge to either edge of the outside rafter plate. This is also referred to as *calculating to the framing points* or *calculating to centers.* The run value is then used to calculate what is referred to the *theoretical rafter lengths* in roof framing parlance. Calculating the *theoretical rafter lengths* this way you would then *subtract* ½ the thickness of the ridge member from the *theoretical rafter length* at the ridge plumb cut after the rafter is laid out. Then, *add* to its length from the *building plumb line* any additional components such as sheathing, overhang length, sub fascia thickness, fascia thickness and any building finishes with their thickness to arrive at the *actual lengths.* This method can best be described as an "additive" method since you "add" the lengths and width of the various components to the length of the rafter from the *building plumb line*.

The effective run method can best be described as a "subtractive" method in which you first must *add* all the components and their various lengths and widths to the run to achieve the overall run and then *subtract* ½ the thickness of the ridge to arrive at the *effective run*. You would then layout the rafter with that length measured from the *ridge plumb cut* to the *tail cut* and then "subtract" the lengths and widths of the various components from the tail cut back towards the *building plumb line* to layout the birdsmouth cut.

In reality, one way isn't any better then the other or is one right or wrong. If you understand both methods you will still come up with the same answers, just taking a different route to get them. The method you choose can also depend on how you do your roof calculations to begin with. Some feel one method (additive) favors the use of a *scientific calculator* and the *step off method*, others feel that a *Construction Master*™ favors the (subtractive) method. Whichever method you choose is still just a matter of personal preference.

Using the *effective run* brings the outer most boundaries of the roof structure into play with all the components of the building and calculates measurements based on the relationship of those boundaries and components. Some believe that this method might have an advantage over the traditional method when it comes to calculating irregular pitched roofs, you can be the judge of that after you see each method in action.

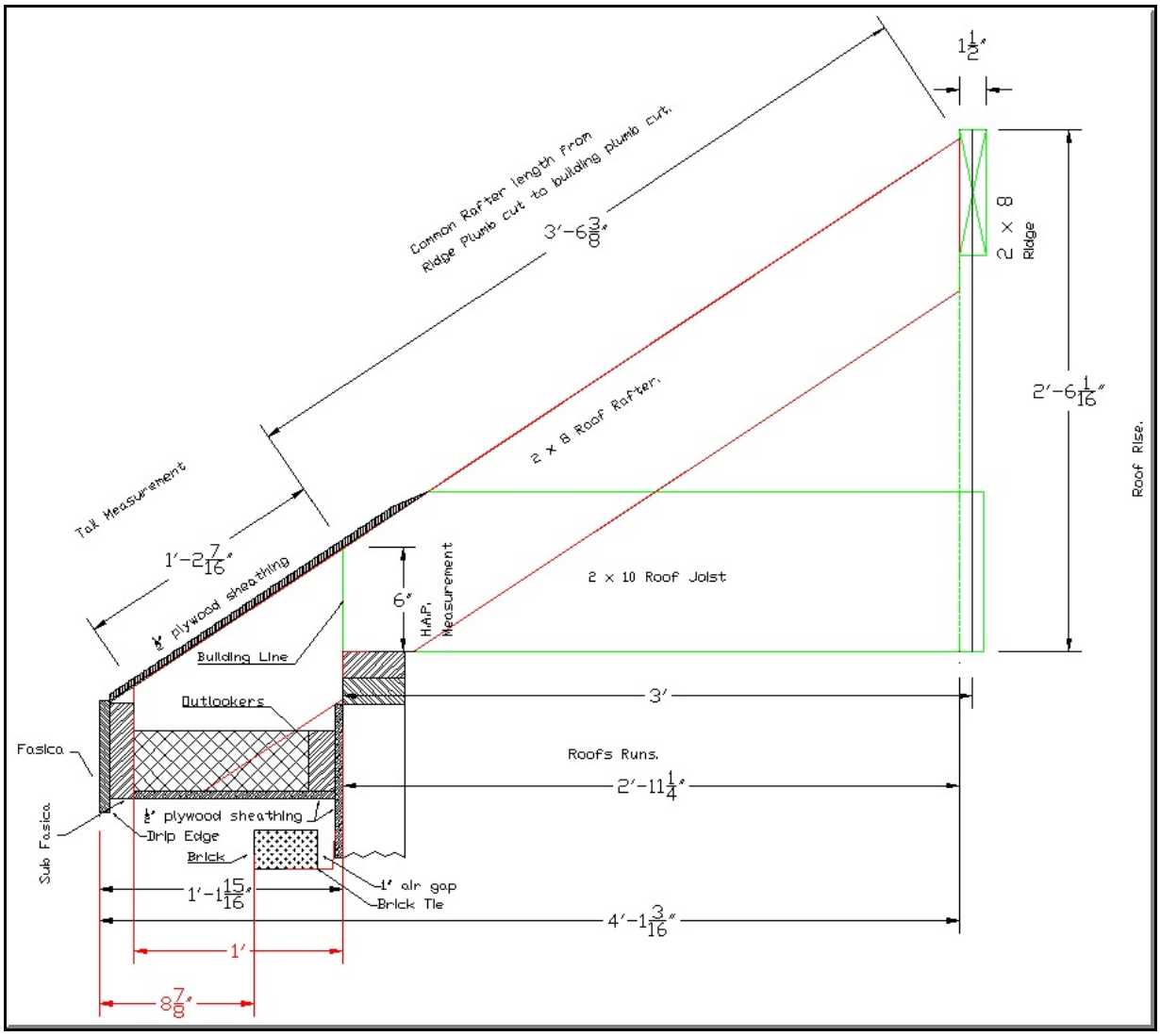

Figure 1 Typical roof overhang detail laid out incorrectly. Illustration by Joseph Fusco

Above is an example of what could easily happen if you don't take all the components into account when calculating the overall rafter length and it doesn't matter which method you use. Here the 1' overhang was the only thing taken into account when laying out the rafter and as a result, the overhang was about 3" shorter then called for. By knowing what the components are and how to apply them to your calculations, this can be avoided.