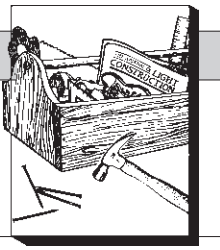
Calculator As Framing Tool



by Jim Hart

Not long ago I accidentally rolled a 2x8 onto my Construction Master II calculator, and the outcome was not a pretty sight. This left me with the choice of either buying another expensive calculator with built-in construction formulas or dredging up my trigonometry textbook and making do with a standard calculator. My decision was clinched when I had the opportunity to review the new Construction Master III.

The manufacturer, Calculated Industries, has made a number of improvements to its original Construction Master II. Now the calculator is even more valuable as an on-site tool. In particular, the new version includes larger keys placed farther apart, which is friendlier to big fingers, and a larger display, which is easier on the eyes.

Makes Math Easy

The beauty of this calculator is the time it saves and the mistakes it prevents when figuring complex math problems in the field. Calculating lengths and angles for rafters and stairs and squaring slabs or subfloors can be done quickly and precisely.

As with the Construction Master II, you can input dimensions in feet, inches, and fractions of an inch. This eliminates the head scratching involved when faced with a fraction on a calculator that reads only decimals. With the *fraction set* key, I can set the calculator to round the solutions to the nearest 1/4, 1/8, 1/16, 1/32, or 1/64 inch. For most problems, I set the calculator to 16ths and let the calculator do the rounding off.

This calculator is also equipped with special functions, such as the *board feet*, *yards*, and *cube* keys, which make it useful as an estimating tool. I frequently use it to accurately figure the yards of concrete needed for a slab or foundation pour.

A Roof Framer's Friend

The Construction Master III really earns its place in my tool belt when it's time to frame a roof. Rafter tables aren't an option for me. They aren't complete enough for the unusual slopes and odd angles I constantly face on complex remodeling jobs in California.

This calculator has undergone several improvements that make it easier to figure jack rafters and irregular hips. To find a common rafter length, all I need to do is input the *pitch* and the *run*, and then push the *diagonal* key, to get the rafter length. Pushing one more key (the *hip/valley* key) gives me the length of the hip or valley. If I have an irregular roof situation, where the hip or valley isn't at a 45-degree angle, all I need to do is input the different pitch of the adjacent roof before pushing the *hip/valley* button to get the length of the irregular hip or valley.

Unfortunately, the Construction Master III booklet isn't specific about how to compensate for the thickness of the ridge. I usually subtract half the thickness of the ridge from the run before doing the calculation. The Construction Master III also doesn't provide any shortcuts for finding backing angles of hips and valleys, so I puzzle through these solutions manually.

For jack rafters, after I find the hip/valley length and enter the on-center spacing (the Construction Master III assumes 16-inch spacing unless told otherwise), pressing the *jack* key will display the length of the longest jack rafter. Each consecutive push on the *jack* key will give the next longest jack rafter length right down to the shortest (see "Calculating Hips and Jacks," for sample problem). This is a considerable improvement over the Construction Master II, which requires a push of three keys instead of one for every jack rafter length. Many times in the middle of a series of jack rafter lengths, I would hit a wrong key on my Construction Master II and need to start over.

The Construction Master III also helps find the pitch of an existing roof by calculating the diagonal of the rise and run. This method is far quicker and more accurate than other methods I've seen, such as juggling a Speed Square and torpedo level on top of a rafter.

Stair Solutions

The calculator can spit out precise stair riser heights and tread lengths for a variety of situations. One problem though: The Construction Master III program defaults to a riser height of 7 1/2 inches, while a recent BOCA regulation requires stairs to have a maximum 7-inch riser and minimum 11-inch tread. Fortunately, the calculator allows you to easily override the default and plug in your own riser height.

Room for Improvement

Since the Construction Master III needs to be in my tool belt during a framing job, I wish it was a bit more rugged. I've often thought of making some type of protective frame for it out of metal channel, which might save my new one from the fate of its predecessor. A leather case available through Occidental Leather is impractical to me, because it makes the calculator difficult to access.

Another helpful improvement would be a built-in function for calculating backing angles. Here in the seismic West, engineers are specifying more and more 4x hip and valley rafters. With these framing members, cutting an accurate backing angle is an important step to ensure that the roof sheathing lays in evenly along hips and valleys. Also, I hope any future incarnations of the calculator will have a built-in method for converting pitches to degrees. This would be helpful during roof framing when cutting angles and bevels.

The Construction Master III is available for $85, including shipping and handling, from Calculated Industries Inc., 22720 Savi Ranch Pkwy., Yorba Linda, CA 92687; 800/854-8075. ■

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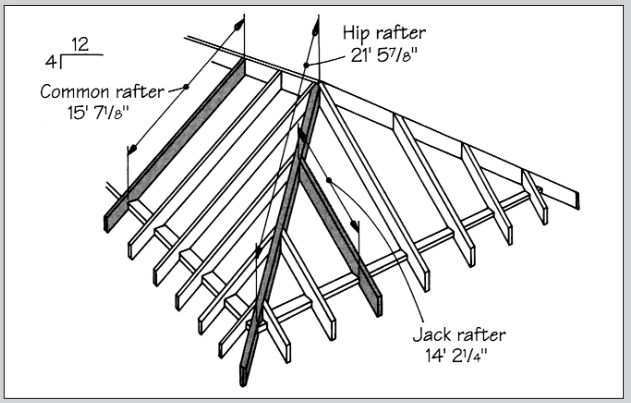
The new Construction Master III calculator simplifies on-site calculations, such as figuring the angles and lengths of roof rafters and stair stringers.

Calculating Hips and Jacks



To figure the length of a hip rafter, begin by calculating the length of the common rafter. First input the pitch — in this case, hit [pitch], then [4] and [12]. Then hit [run] and enter the length of the run (14 feet 9 1/2 inches). A push of the [Diag] key produces the common rafter length of 15 feet 7 1/8 inches. A push of the [Hip/V] key gives the length of the hip rafter at 21 feet 5 7/8 inches.

To find the length of the first jack rafter, now push the [Jack] key. This gives you a length of 14 feet 2 1/4 inches. Each consecutive push of the [Jack] key gives you the length of the next shorter jack rafter. (**Note:** These lengths are calculated to the center of the hip. For a 2x hip rafter, subtract an inch from each length to account for the thickness of the hip.)

— *J. H.*