

CUTTING COVE MATS

Cove mats can add visual interest to many framing projects, and a CMC makes producing them relatively easy

The cove mat, also known as a pan mat, has been a useful design element for picture framers for a long time. However, calculating the dimensions is often a challenge for framers who may not be math experts, and cutting a cove mat on a manual mat cutter requires careful precision to get all the corners and edges to join neatly.

As with most manual framing skills, cutting a cove mat becomes easier with practice, but the problems of geometry and the limited precision of manual cutters cause many framers to cut the mat first and then cut the frame to fit it. Fortunately, having a computerized mat cutter (CMC) and advanced mat-design software makes producing a perfect cove mat much easier to do. The design program provides perfect lines and shapes in the cutting file, and the machine cuts with far more precision than any manual mat cutter, even in the hands of an expert framer.

This project, framing a folded flag and certificate, benefits from two cove-matting techniques that help bring both the items to equal prominence in the frame. Surface mounting displays the flag prominently when it is sewn to the floor of a shadowbox. In the same shadowbox with the flag, the flat certificate needs some help to keep it from getting lost visually. It could be simply matted and elevated off the background, but the angles of a wide cove mat and a reverse-cove riser create a more integral design and improve the visual attractiveness.

A key benefit of using a CMC to cut cove mats is that a framer can create a template to cut them at any dimension. Once a template is made, the dimensions can be



quickly rescaled for future cove mat designs. For this example, screen shots from Corel Draw X4 are used to illustrate the process because the software is adaptable to all the newer CMC models. Most other advanced design programs for CMCs function similarly.

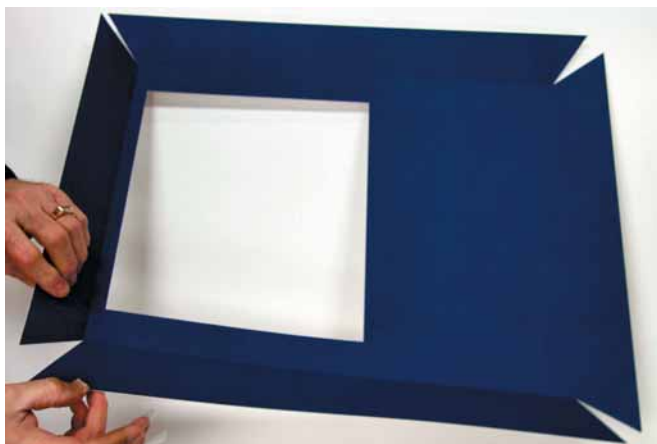
Designing the Cove Mat

As with all framing designs, first determine the width and height and the mat. For a cove mat, however, you also need to work with frame depth. If this were a simple shadowbox with vertical mat walls, the height and width needed for mounting the items would represent the mounting area as well as the frame's full size. But a cove mat, which may be considered a modified window mat, adds an extra margin in the mounting area.

A cove mat design begins with the floor area--the flat area within the cove where the items are to be mounted. In your CMC design program, plot a rectan-

ON A CMC

By James Miller, MCPE, GCF

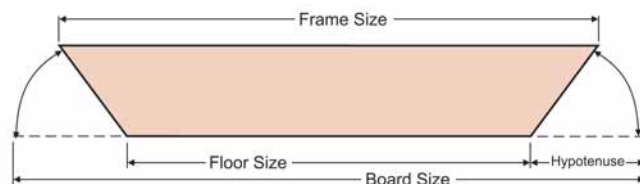


After cutting, a large cove mat may be fragile, so handle it gently. Especially take care not to tear along the fold lines for the floor area, where the board has been scored halfway through.

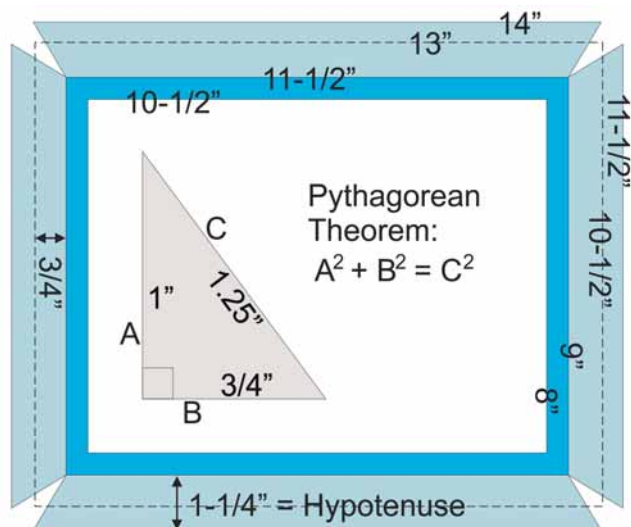
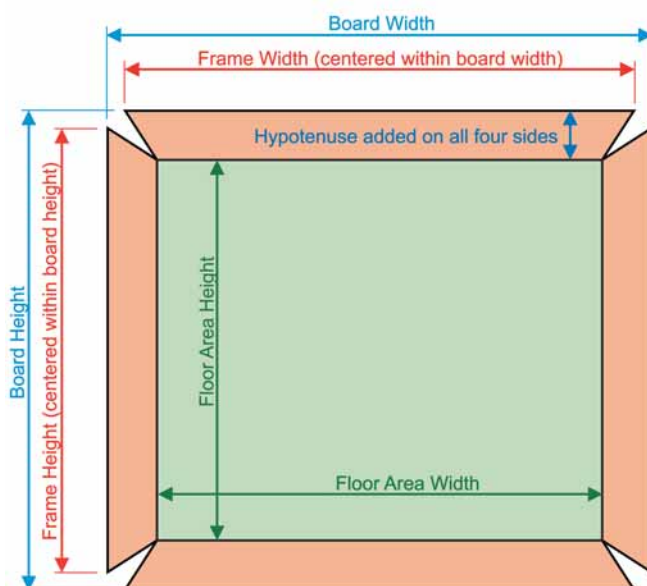
gle in the center of the page to represent the floor area. At this point in the process it may be helpful to sketch a right triangle and identify the vertical dimension (A) for frame depth, the horizontal dimension (B) for the offset, and then the angled-side dimension (C), the hypotenuse of the triangle. Any two of these dimensions may be arbitrary, and the third dimension may be calculated by using the Pythagorean Theorem of $A^2 + B^2 = C^2$ with an ordinary calculator. The calculations are quick and easy.

When deciding the cove mat's depth, the vertical dimension (A), take into account the thickness of other framing materials, such as glazing and backing boards for reinforcement. All of it has to fit within the shadow-box moulding's rabbet depth, so make the cove mat's depth $1/4''$ to $3/8''$ less than that.

How much horizontal offset (B) would be appropriate for the project? As your triangle sketch will illustrate, if you use a narrow offset, the cove mat's angled sides would be steep; if you use a wider offset, the sides' angles would be more relaxed. Whatever horizontal offset you decide to use, add this dimension to all four sides of the floor area to determine the frame's height and width. Plot a rectangle to represent the frame width and height. Note that the frame size is not the same as the perimeter to be cut.

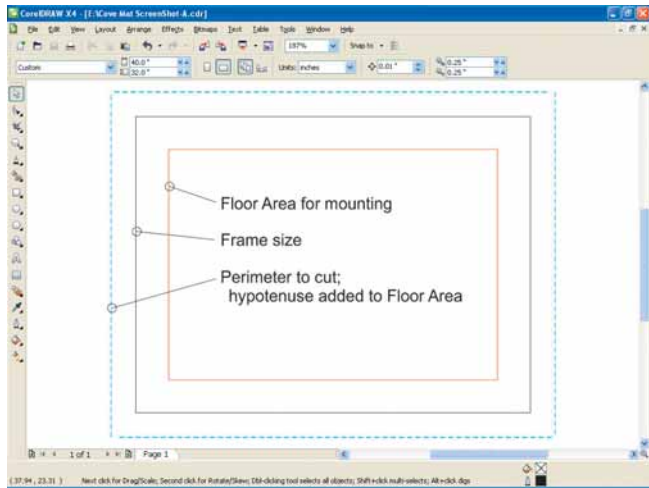


This drawing shows the key elements of a cove mat and illustrates the difference between the frame size and the cove mat's perimeter to be cut.

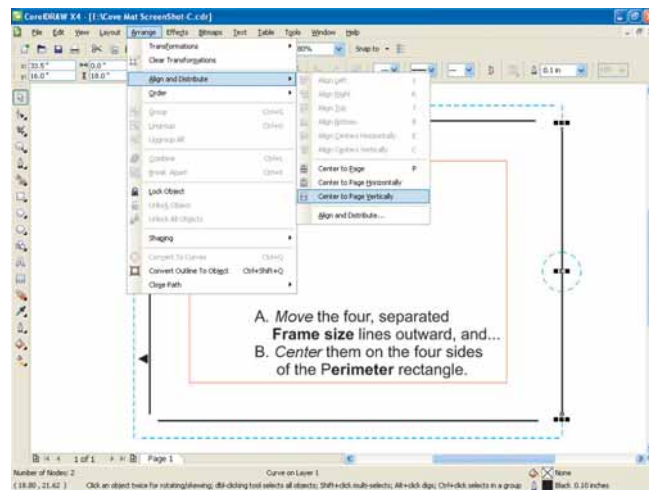
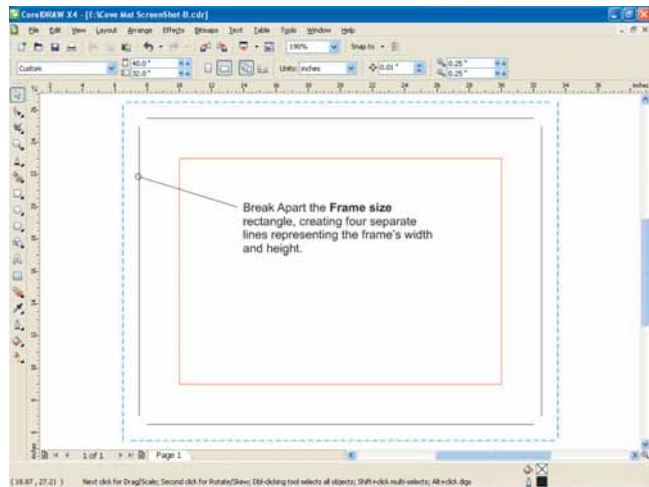


This illustration, created in Corel Draw X4, shows how the dimensions are translated into the mat design's cutting file.

To calculate the perimeter of the cove mat to be cut, add the hypotenuse dimension (C) to all four sides of your floor area rectangle. Plot a rectangle of this perimeter in your design program, and center it on the page. At this point you should have three rectangles centered on the page in your design program, representing the floor



When designing a cove mat, it is essential for all three rectangles to be centered on the page of your design program in order to have equal margins.



area, the frame size, and the perimeter to cut.

Next, break apart the four sides of the frame-size rectangle, making two horizontal lines match the frame's width, and two vertical lines match the frame's height. Let's call these the frame lines, since they represent the frame's width and height. Superimpose these four frame lines onto the perimeter rectangle on your page. Center the horizontal lines on the page horizontally, and center the vertical lines on the page vertically. The perimeter rectangle's purpose has now been served—to provide positioning of the frame lines. Delete the perimeter rectangle, leaving the floor area rectangle and the four frame lines, all properly centered. The frame lines now represent the perimeter of the board you will cut.

Those four frame lines floating in space would be useless, so connect their ends to the corner points of the floor area rectangle, making an angled “V” in each corner. When you finish this step, weld together the outer lines and the Vs, creating an integral shape. This completes the cove mat template. You should have two shapes centered on the page; a rectangle representing the floor area, and a larger rectangle with angled “V” corners representing the perimeter of the mat to be cut. Each V should touch a corner of the floor area rectangle.

A quick and easy cove mat calculation program has been created by John McAfee in Belfast, Ireland, for the benefit of framers. At the Framers Forum (UK), you can download his handy program from www.tinyurl.com/yedt6jr. It is a small file, so it loads quickly.

Cutting the Mat

The remaining work is to specify the cutting sequence and types of cuts to suit your machine. If your CMC has a straight-cutting blade, use that to cut your cove mats face down from the back. First, cut halfway through the board's thickness for the floor area rectangle, then cut out the perimeter, including the angled V corners. If your CMC cuts bevels only, cut a shallow/narrow V-groove for the floor area rectangle, then cut bevels on the perimeter. Again, cut the mat from the back. Save this file as your cove mat template.

When you want to modify your saved cove mat template for different dimensions in the future, you will need to re-size the floor area rectangle, the perimeter rectangle to match the new frame's width and height, and the hypotenuse dimension. That is, you will need to reshape the angled V in each corner to fit the frame's

width and height by dragging nodes to fit the new dimensions. Always keep the shapes centered on the page in your design program so that the angled Vs will be the same on all four corners.

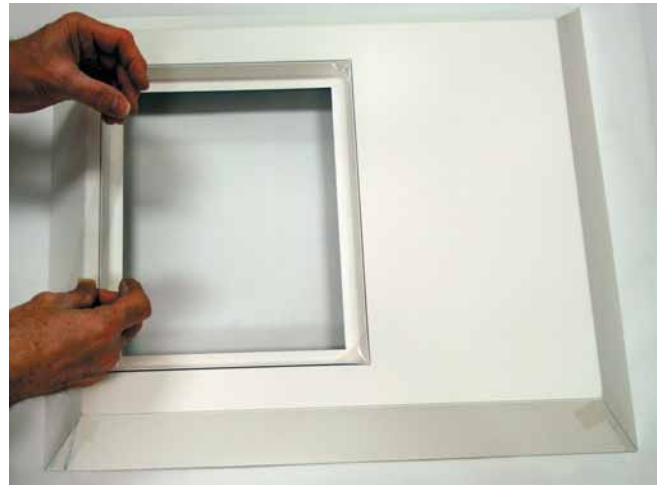
After you cut the cove mat, fold the perimeter flaps, taking care not to tear through the shallow cut of the floor area rectangle. Align the edges carefully. Especially if you made bevel cuts, avoid denting or deforming the fragile, sharp-cut edges. Use a strong, good quality plastic tape, such as Framers' Tape, to securely join each corner together.

Remember the triangle you sketched in the beginning of the cove mat design? Trim triangles of those dimensions out of foamboard and use them as gussets to reinforce the angled sides of the cove mat. A small scrap of foamboard would provide a dozen or more triangular gussets—quick work if your CMC can straight-cut that material. Gussets are especially helpful when a cove mat is large or if the sides tend to bow outward. Gussets also help reinforce taped corners. If you fit the frame too tightly, the taped joints at the corners may pull loose, as the pressure of tight fitting tends to flatten out the cove mat.

This project uses a reverse-cove riser to elevate a document. This is essentially an inside-out cove mat. It would be cut in the same way, but upside down, then folded and joined the opposite of an ordinary cove mat assembly. Straight cuts fold and align more neatly than bevel cuts. Reverse-cove risers may also be used to elevate objects as well as documents. For example, sports or military medals may be individually mounted on reverse-cove risers, perhaps 1-1/2" wide by 3" high by 3/4" deep.

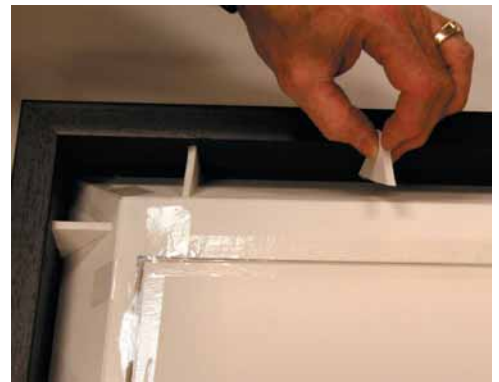
Aligning and joining the corners of a reverse-cove riser is more difficult than for an ordinary cove mat, since taping the usual way would have to be on the outside of each corner. A good way to deal with this is to cut a base mat with a reverse-bevel window to fit the riser's folded perimeter, tuck it in and retain the side flaps within the window of the base mat. If multiple medals are to be individually mounted on reverse-cove risers, a group of them could be precisely positioned in multiple openings of a base mat.

Of course, this process can also be used to cut a cove mat using a manual mat cutter. However, manual cove mat cutting is much more labor intensive, requiring very careful pencil marking of the mat and then very precise

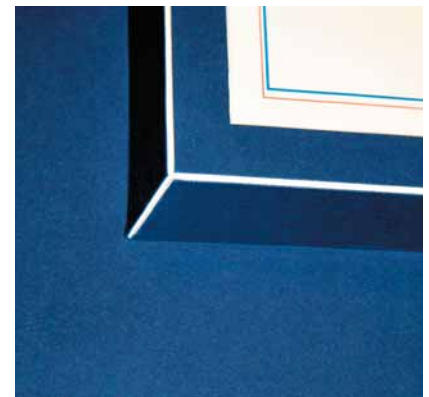


This view show how the base opening slips over the reverse-cove mat to hold its sides in perfect alignment. From the back, tape all sides to prevent any shifting of the parts during handling of the mat and the completion of the framing

Install the gussets around the perimeter to keep the sides of the cove aligned. This is especially helpful on a large cove mat. These triangular reinforcements make a big difference in the stability and durability of the assembled cove mat.



A snug-fitting base opening in the floor area retains the edges of the reverse-cove riser, eliminating the need to fasten the corners individually. If reverse-cove risers are used in a group, the base openings would assure proper spacing and alignment.



As shown here, the CMC cuts precisely and consistently, so that the folded/taped corners show no gaps, over-cuts, or misalignments. This quality would be more difficult to achieve if you cut a cove mat manually.

cutting of the shapes. Having a CMC makes a cove mat faster, easier, and more profitable.

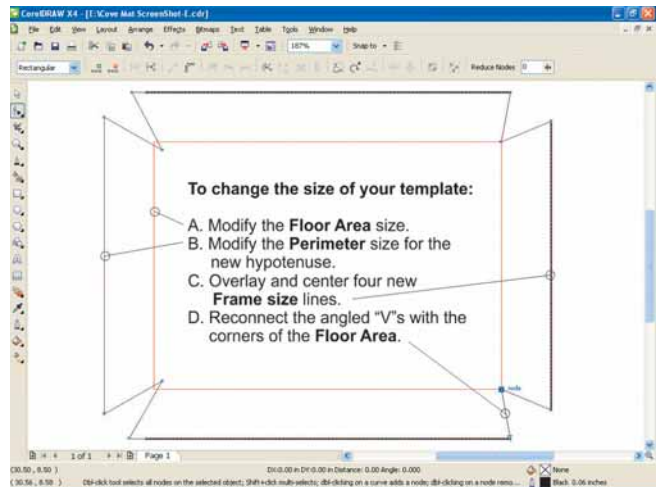
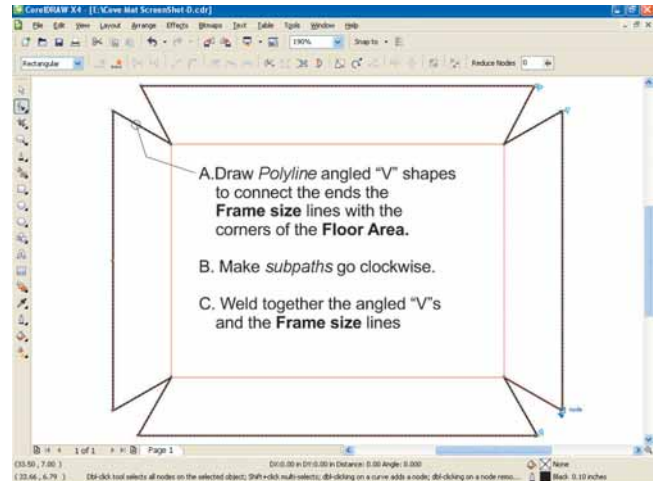
Cove mats can be useful to add emphasis and visual interest to three-dimensional framing projects, and they can be very cost-effective as well. Customers are often happy to pay extra for a cove mat. Only the usual mat-board is required along with the gussets and a bit of labor to program a CMC to cut the parts. Be sure to price these unique features profitably. Your competitors, even those who use CMCs, may not share your proficiency with cove mats and may avoid them unless a customer asks.

Like all decorative features in framing, cove mats need to be shown to customers. Try practicing your CMC skills to produce a few models for your gallery. Not only will this give you the confidence to use a CMC for these creative features, but the samples will show your clients a new design option that they may never have considered before. ■



James Miller, MCPF, GCF, founded his framing business, ArtFrame, Inc., in suburban Columbus, OH, in 1988, where he specializes in the preservation framing of art, heirlooms, and three-dimensional objects. Miller, who holds a Bachelor's degree in Business Administration, has served as

chairman of the PFA Certification Board, where he helped develop the MCPF exam, and has been chairman of the FACTS Education Committee. He is also the author of *The Complete Guide to Shadowboxes and Framing Objects*, published by PFM Seminars Books.



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