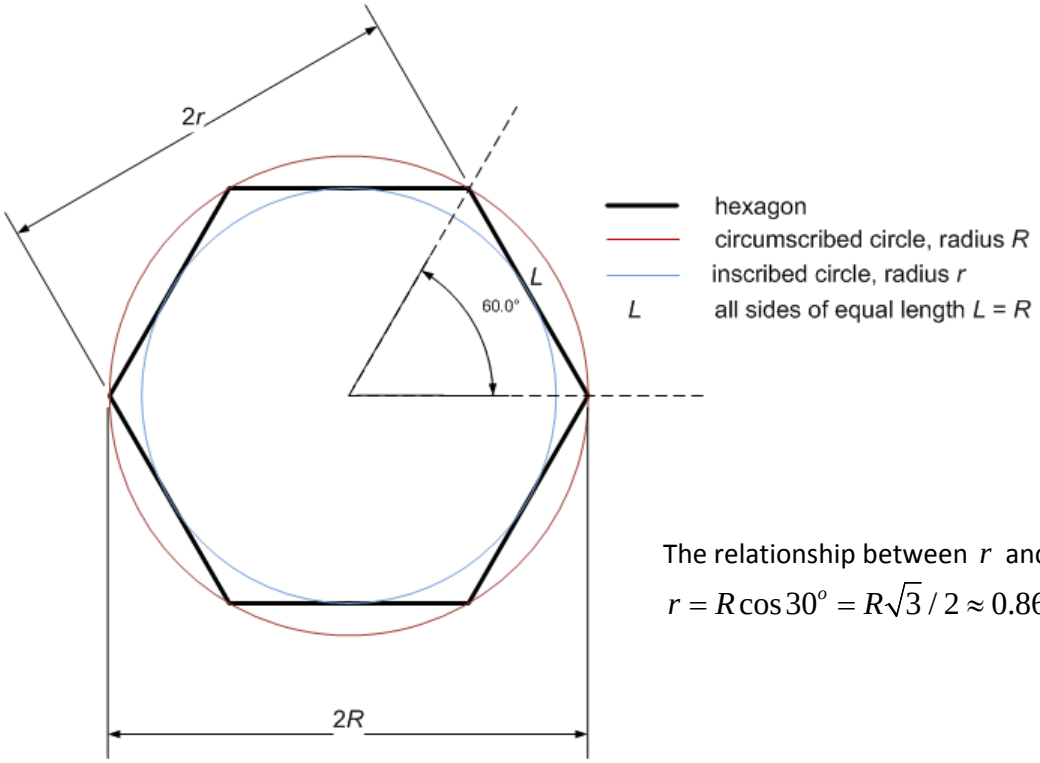
CUTTING HEXAGONS ON A TABLE SAW

Following is a method for cutting hexagons on a table saw. It is similar to Jim Cummins method for cutting them on a bandsaw, as he describes in his video *Small Shop Projects*. To begin, the geometry of an hexagon is shown in Fig. 1.



The relationship between r and R is

$$r = R\cos 30^o = R\sqrt{3}/2 \approx 0.866R.$$

Figure 1. Hexagon Geometry

A variety of methods can be found on the internet for cutting a hexagon on a table saw from flat stock. Most begin with a square piece of stock that is of dimension 2*R* on a side or larger. The circumscribed circle of radius *R* is drawn and the hexagon laid out, usually by using a compass set to the length length *L* = *R*, marking equidistant points on the circumscribed circle, and connecting these points with straight lines. Once that is done, the hexagon is cut along its straight-line edges. While good results can be achieved, it is common for Inaccuracies to arise from errors made in laying out the hexagon and in lining up the stock with the saw blade for the six cuts. Care is needed when performing the cuts as dangerous kick-back can occur. This is especially so when cuts are made with the stock between the saw fence and the saw blade. Then, there is a chance either for the stock to jam between the fence and blade and get thrown back forcefully towards the user or for the user to come in contact with the spinning blade.

Following is a method that requires one accurate cut of stock to width $2r$, a stop block cut accurately to 60^o, and setting a fence accurately to be 60^o to the plane of the saw blade.

Step 1. (Preliminaries) Cut a length of stock to width $2r$. The length is not critical but should be at least $2R$ but does not need to be significantly more than that. Make a jig, for example of ½ in. MDF, in the form shown in Fig. 2 to be used as a stop block in Step 5. The size is not critical except for the 60^o vertex.

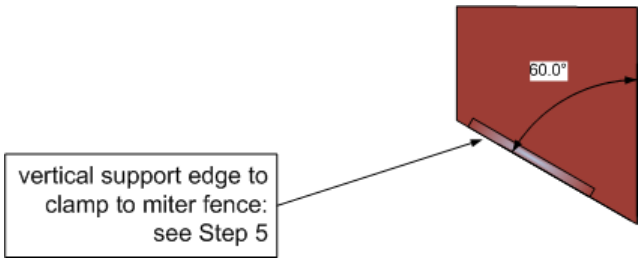


Figure 2. Sixty Degree Jig

Step 2. Set up the table saw and miter gauge as shown Fig. 3.

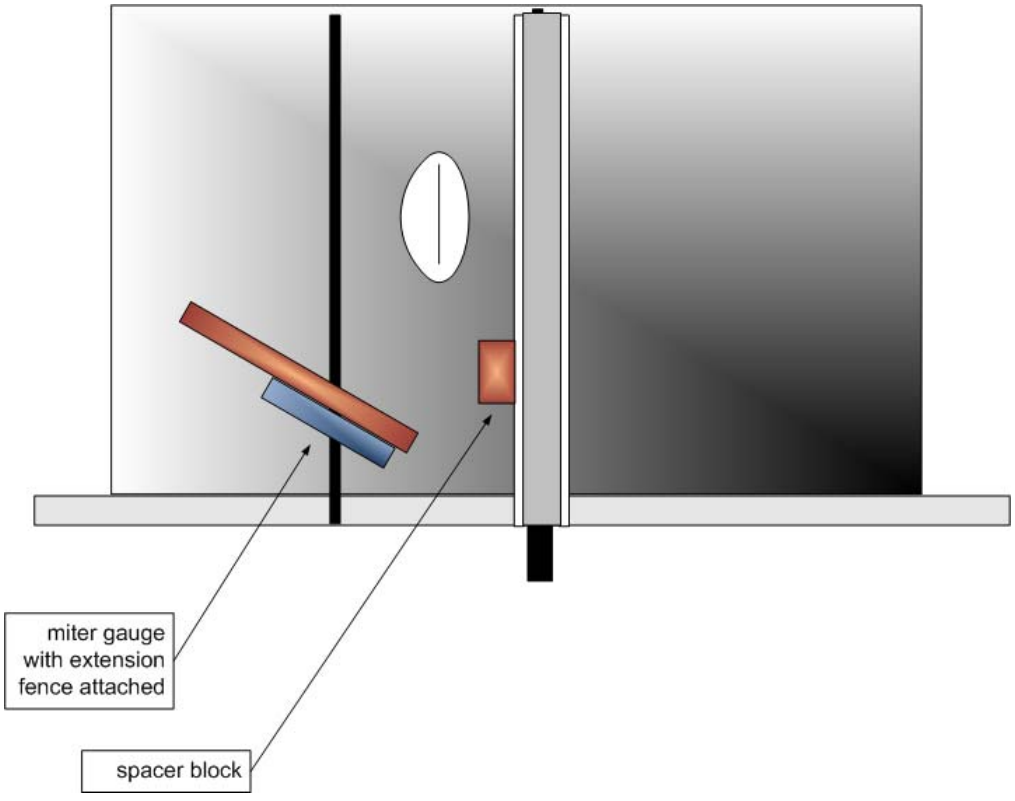


Figure 3. Setup of Table Saw

In this setup, the miter gauge with attached fence can be replaced by a sliding crosscut box for added accuracy and safety. The purpose of spacer block is to reduce the chance of kick back when making the

first two cuts described below; it reduces the chance that cut off pieces can jam between the fence and saw blade and be tossed back towards the user.

The miter guage angle and fence position are unchanged in completing the first and second cuts.

Step 3. The stock cut to width $2r$ and length at least $2R$ is positioned for the first cut as shown in Fig. 4. Note that the cut line (left side of saw kerf) should pass through the right end of the stock somewhere between the center of the stock and the opposing edge.

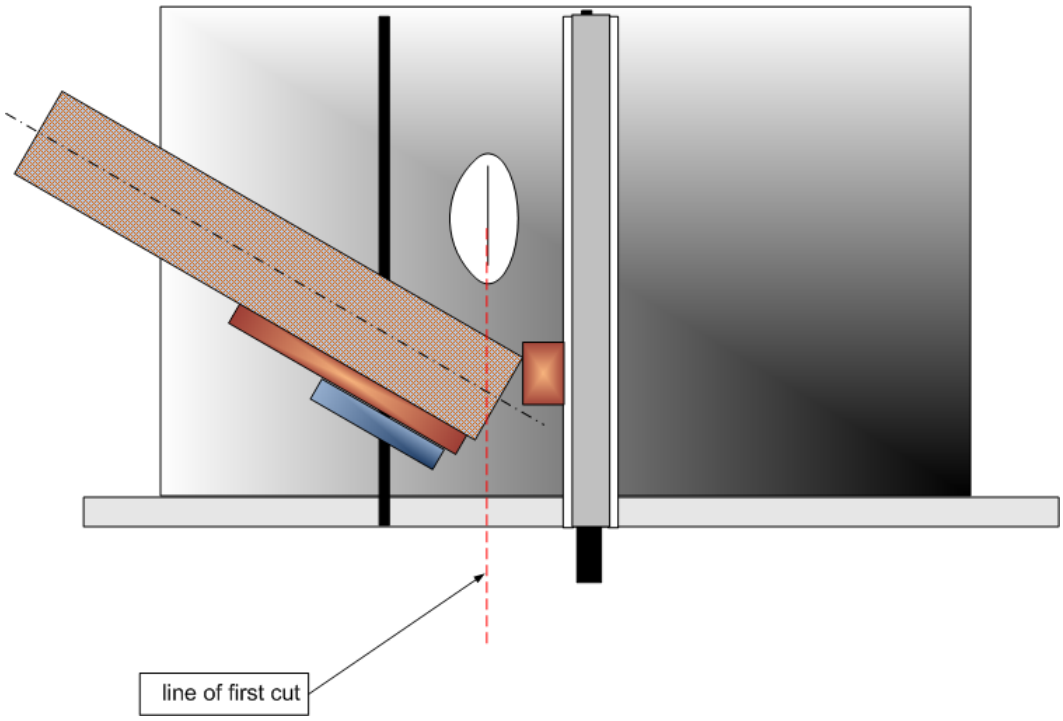


Figure 4. Setup For First Cut

The result of the first cut is shown in Fig. 5.

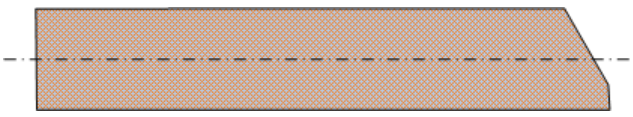


Figure 5. Result Of First Cut

Step 4. Now flip the stock over, and put it in place for the second cut, as shown in Fig. 6.

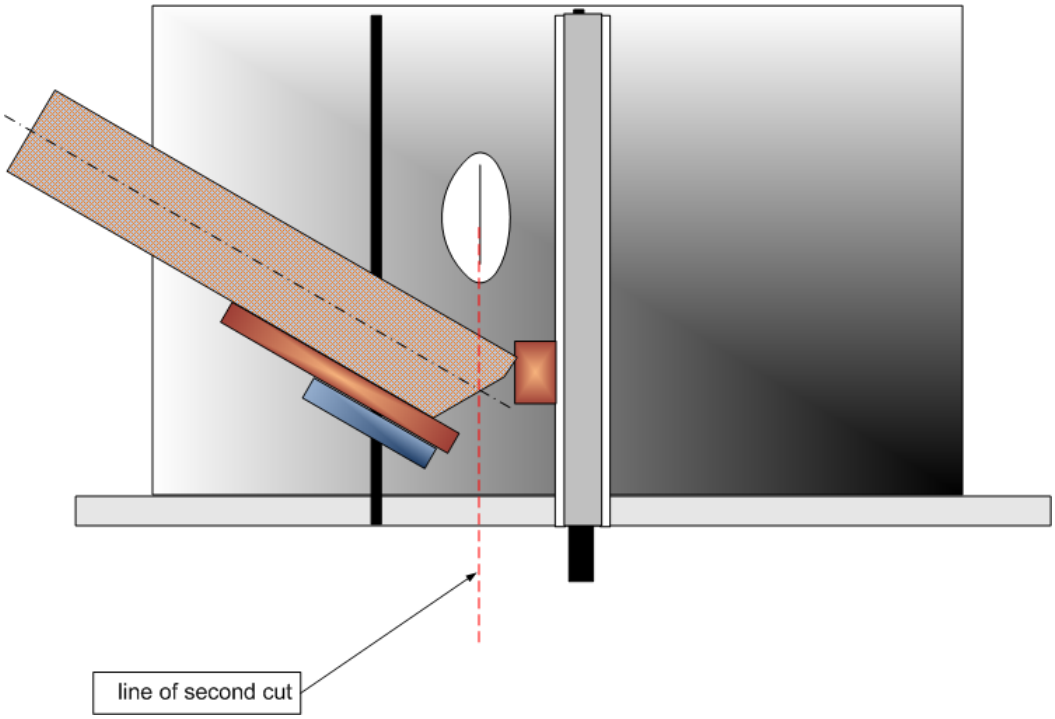


Figure 6. Setup For Second Cut

The result of the second cut yields the stock with two sides of the hexagon, as in Fig. 7.

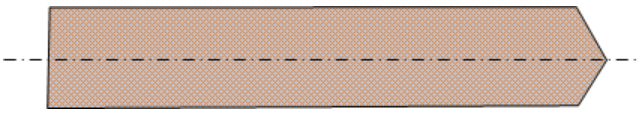


Figure 7. Result of Second Cut

Step 5. While leaving the miter gauge angle unchanged, place and clamp the 60^o stop jig to the miter fence at a distance $2r$ from the saw cut line, as in Fig. 8. This can be done using the stock since it's width is $2r$, as shown in Fig. 9. Move the saw fence away from the saw blade, or remove it altogether, so it does not interfere with the stock on subsequent cuts.

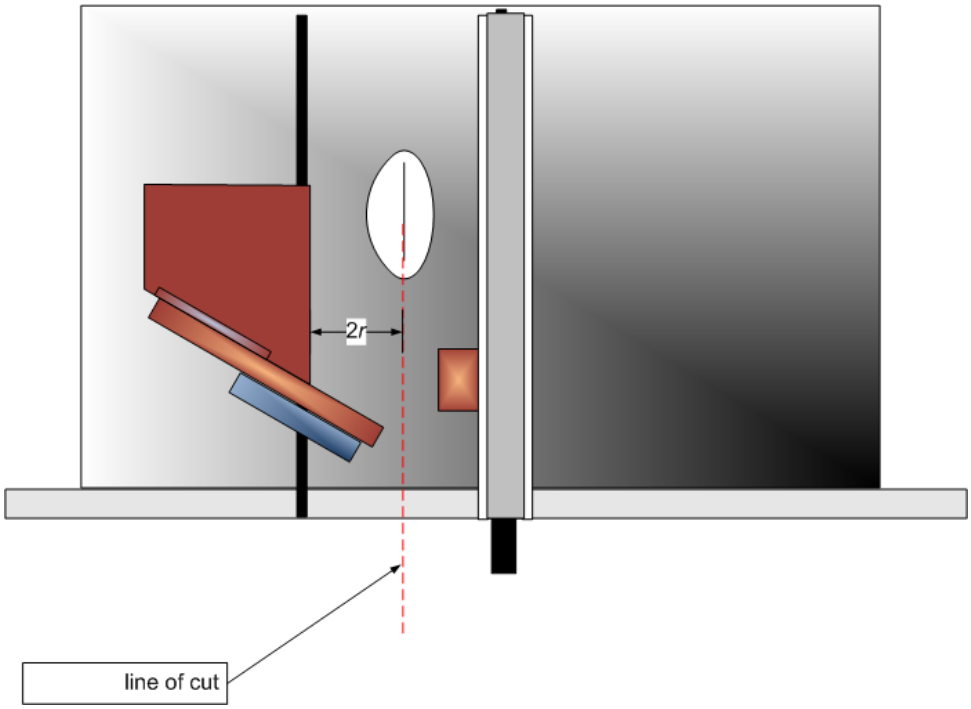


Figure 8. Saw Setup For Third Cut

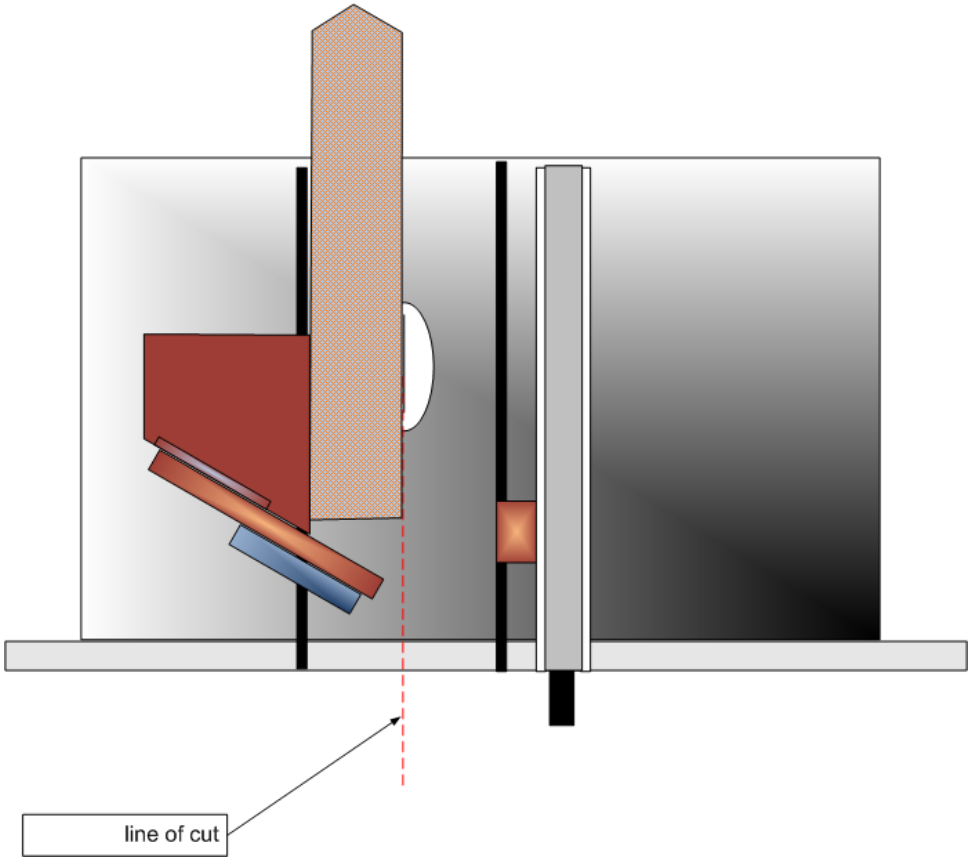


Figure 9. Using The Stock To Setup For Third Cut

Step 6. Place the stock as shown in Fig. 10, and make the third cut.

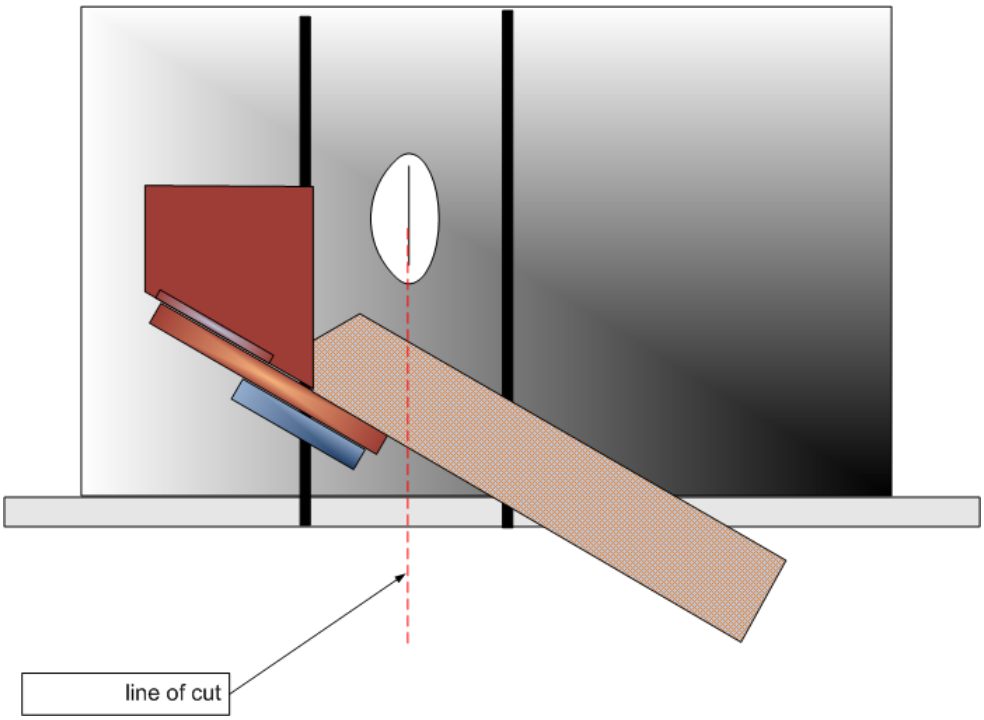


Figure 10. Third Cut

The result of the third cut is shown in Fig. 11.

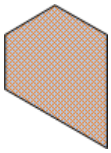


Figure 11. Result Of Third Cut

Step 7. Rotate or flip the result of the third cut, and place it for the fourth, and last cut, as in Fig. 12.

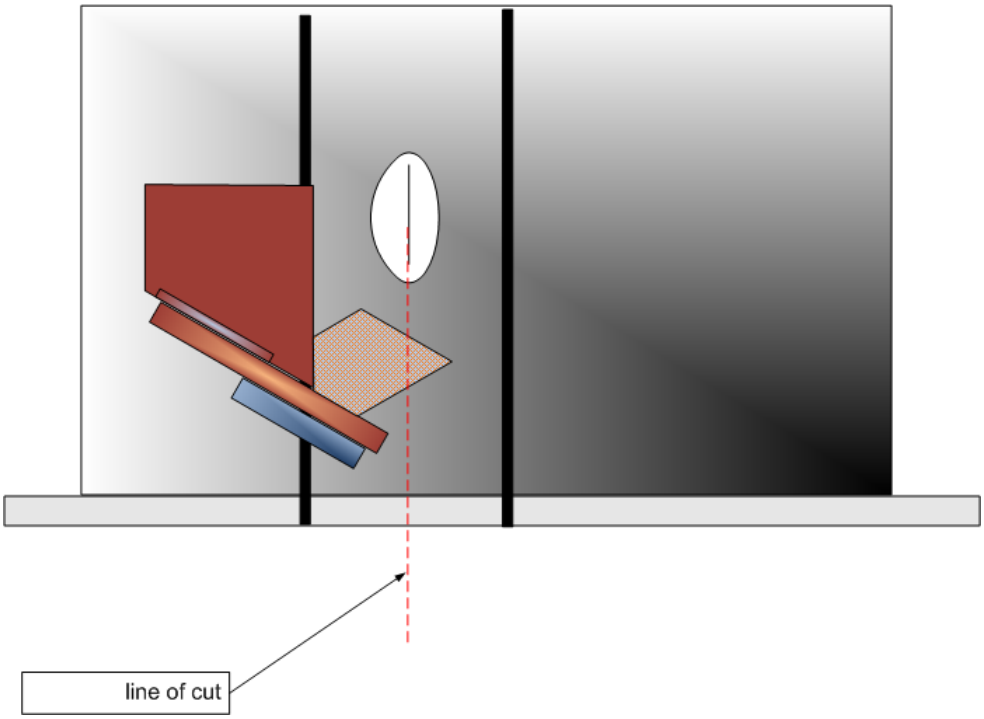
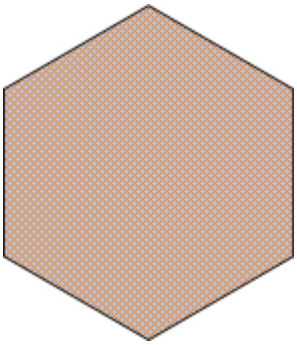


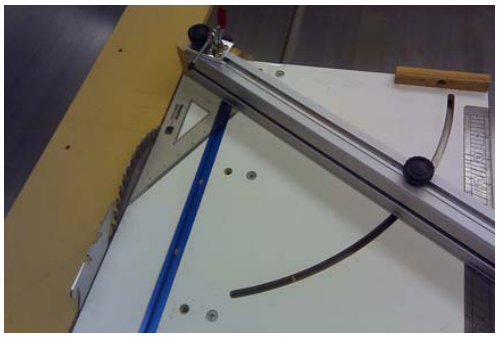
Figure 12. Saw Setup For Fourth Cut

The desired hexagon results.

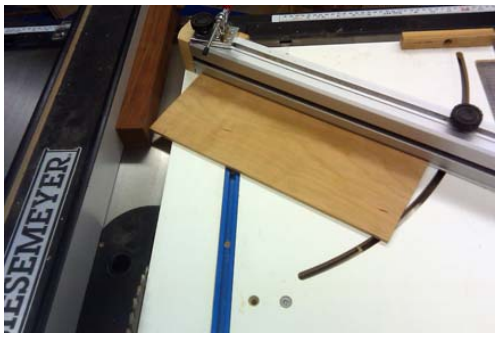


This table-lamp project has a base in the form of a hexagon with sides that slope five degrees from the vertical. Eight hexagons are needed for capping the base. The dimensions of the hexagons are $2R = 5.375$ and $2r = 4.688$ inches. Stock is prepared with dimensions W x L x T = 4 11/16 x 13 1/4 x 3/16 inches. The length is selected to yield two hexagons for each piece of stock. Following are pictures of the sequence to produce the hexagons.

Prepared Stock



Setup of Cross-Cut Sled Fence

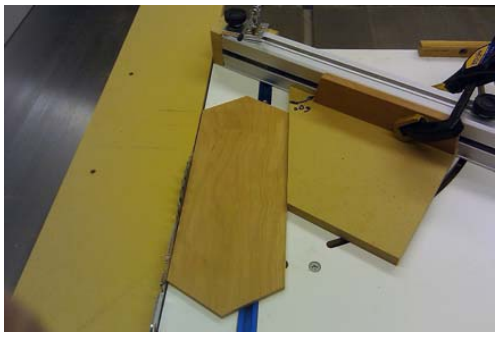


Setup For First Cut

Setup for Second Cut

Result of First and Second Cuts

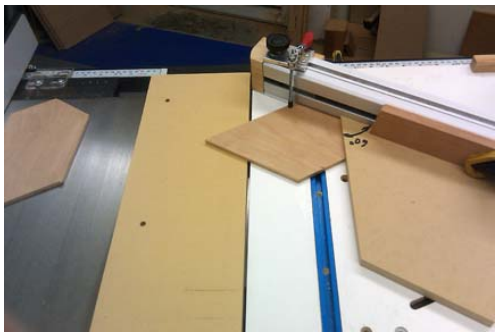
Result of First and Second Cuts On Both Ends Of All Stock



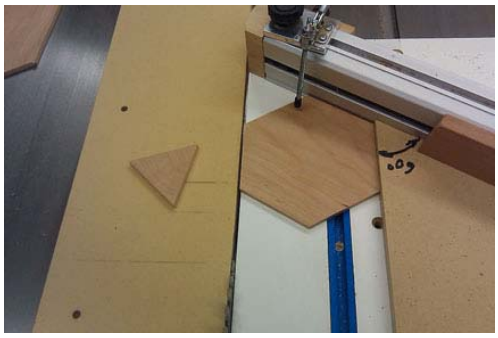
Setting Fence Stop For Remaining Cuts Using Stock

Setup for Third Cut

Result of Third Cut



Setup of Fourth Cut



Result of Fourth Cut - A Hexagon

Resulting Hexagons for Lamp Caps