



## Making Large Case Formers

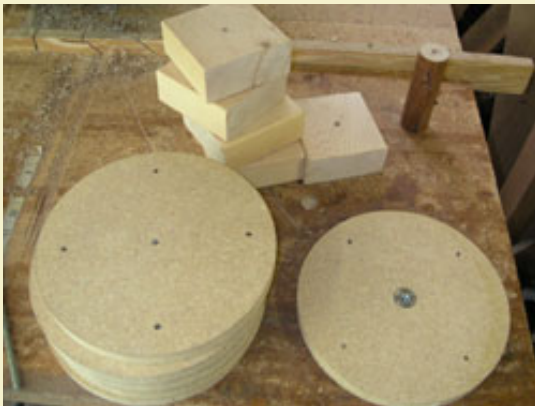


Figure 1: Case former components ready for assembly.



Figure 2: T-nut counter sunk into the center of the bottom disk.

### Introduction:

Cylindrical case formers for rolling canister shells can be made in a variety of ways, limited only by the tools and materials available to the pyrotechnist. While good quality commercial case formers can sometimes be found made of wood, most hobbyists resort to making their own from whatever they can find. Smaller case formers can easily be made from sections of PVC or mortar tubes that have the desired O.D. For example, a 3" HDPE mortar with a 1/4" wall thickness is the correct size for making 4" shell case formers (which have a 3-1/2" diameter). This technique can be used with 4" and 5" mortars as well. Another method is to find a piece of pipe or even a spray can that is close to the desired O.D. and then build it up to the proper O.D. by wrapping turns of paper around it. I have seen wooden 6" case formers converted into 7" case formers by wrapping a 1/2" thick layer of newspaper around them. Case formers don't have to be pretty, they just have to be the right size!

Ideally a case former will be solid with a nice handle at one end to help remove the former from the finished case. The former should also have a ventilation cavity down the center so that suction forces do not prevent a tight fitting case from being removed. Good case formers will also have a slight taper toward the end opposite the handle so that the finished cases will slide off easily. Since some cases are rolled wet, a good former should also be waterproof and easily washed down without damaging the former.

A wood lathe can be used to easily create your own high quality case formers with only a minimal amount of turning skill. However, most consumer wood lathes don't have enough clearance to turn anything larger than a 6" case former. It is the larger case formers that prove the hardest to make, since it is harder to find large diameter pipes of the right size and building large formers up with paper tends to require a lot of paper.

The method of making case formers shown here is ideal for larger sized formers for shells 8" and larger. It is easy to produce any length and diameter that you desire, as well as taper it toward one end, without the need for a large lathe or special tools. The resulting former is smooth, washable, vented and yet not overly heavy the way a solid wooden former of the same size would be.

### Construction

The case former shown here is made by building a support frame from wooden disks with spacers between them, then covering the



Figure 3: Threading pieces onto the center tie-rod.



Figure 4: Washer and lock nut fastened at end of handle.

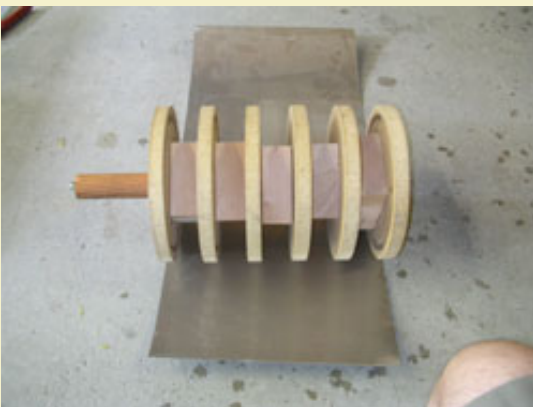


Figure 5: Aluminum flashing ready to fasten to frame.

frame with aluminum flashing. The disks shown in Figure 1 were cut from particle board using a band saw, although a hand-held jig saw could just as easily be used. The center point of the disks must be accurately marked, so it is best to use a compass to draw the circles if possible so that you know where the exact center is. The disks can then be sanded smooth on the edges using a vertical sander to remove irregularities from the saw marks. However, the aluminum cover will tend to hide any defects that are not too extreme, so you can skip the sanding step if you don't have the tools to do it.

If you want a tapered former, which is recommended, you will need to cut the disks in a series that decreases in size from one to the next, then number them as you go so they can be kept in the proper order. The largest disk starts where the handle will attach, then each successive disk gets smaller. The O.D. doesn't need to decrease more than 1/8" between the smallest and largest disk, so the size difference between each disk will be very miniscule.

A 1/4" threaded rod will run through the center of the former, which will be used to hold everything together. Thus each disk needs a 1/4" or slightly larger hole drilled through the center point (except for the bottom disk, don't drill that one yet). You should also drill some ventilation holes through each disk as well in order to prevent the suction problem as previously mentioned. Four vent holes plus the center hole can be seen in the disks depicted in Figure 1.

The 1/4" threaded tie-rod will connect into the bottom disk using a T-nut that is counter sunk into the disk as seen in Figure 2. A T-nut is a threaded tube that has a flange on one end which keeps it from pulling through. The flange will be located on the outside face of the bottom disk. The flange needs to be counter-sunk so that it sits flush with the surface of the disk, so be sure to drill this larger hole first before drilling the smaller hole that the nut fits down into.

A block of 2x4 is used between each disk to create a 1-1/2" wide spacer. You will need to decide how long your case former should be, then figure out how many disks and blocks of wood to cut.

The final component is the wooden handle, which can be as simple as a wooden dowel rod with a hole drilled down the middle as seen in Figure 4. Due to the difficulty of drilling such a deep hole down the middle of the dowel rod, you may need to limit the length of the handle to 3-1/2" or 4".

Once you have all the components cut, the threaded rod is screwed into the bottom disk and the other pieces are threaded onto it. Wood glue is applied to the 2x4 spacers to help solidify the rammer once it is threaded together. Figure 3 shows how glued blocks are placed between the disks. The final disk is topped with the wooden handle, as seen in Figure 4. A washer and lock nut are firmly tightened down to clamp the whole assembly together.

Next you will need to cut a piece of aluminum roofing flashing so that it wraps one turn around the former, with about a 3/4" overlap where the pieces meet. The flashing can be bought in small rolls in almost any hardware store.



Figure 6: Marking the rib positions.



Figure 7: Securing the seam by stapling to the frame ribs.



Figure 8: Final protective clear-coat using packing tape.

When you have a piece cut to the right size, secure the corners to the case former using a staple gun so that you can pull it tight around the frame. Figure 6 shows how you can use a marker to indicate where the internal ribs are located, which helps you shoot the staples into the correct spot once the frame is fully covered. Figure 7 shows the stapler used again to secure the overlapping seam to the wooden frame. The staples should be tapped down flush with the aluminum using a small hammer.

The final step is to wrap the former with clear packing tape so that the seam edge and staples will not be able to catch on the paper casings during use. The tape is started just behind the seam, then pulled very tight so that the edge of the flashing is securely held flat against the former. The tape band is run all the way around the former, then back over the seam once more for a double layer of protection. Parallel bands of the tape are applied next to each other as closely as possible, with care being taken not to overlap the edge of one band on top of the other. Care must also be taken to avoid getting wrinkles in the tape while applying it.

Note that the T-nut on the bottom prevents you from drilling out a spolette cavity for use when rolling cases with the spolette already glued into the end disk. Since the "upside down" method of shell building is not usually used on larger shells anyway, this limitation is pretty much a non-issue. 🔥





Figure 9: The finished case former.