CONICAL ROOFING SIMPLIFIED

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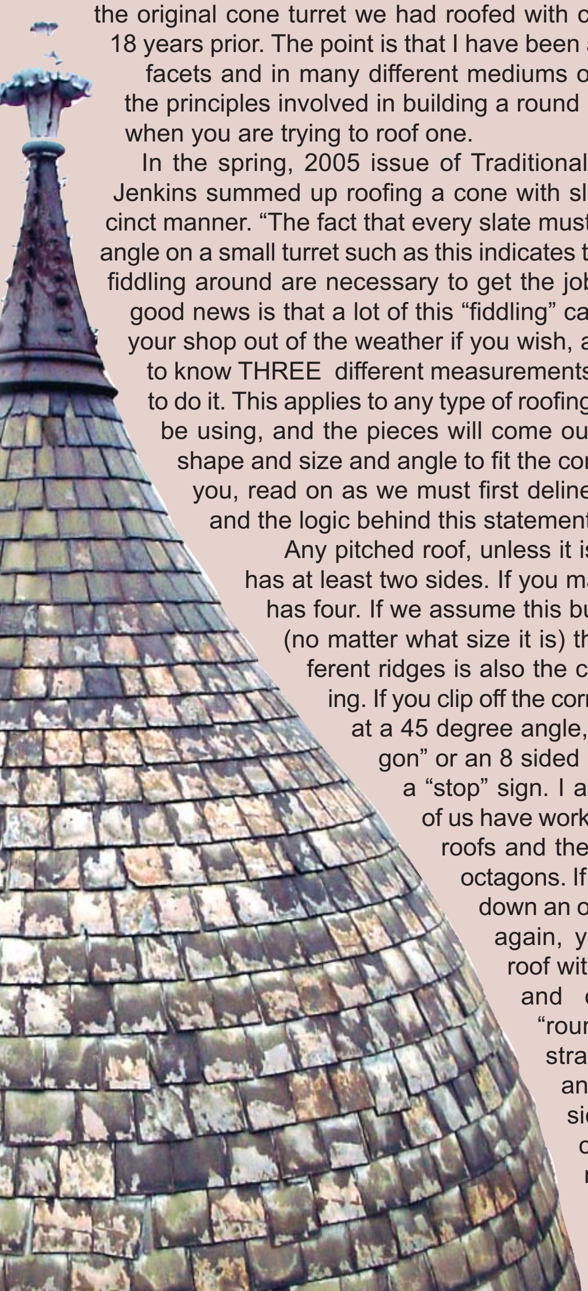
As a third generation union carpenter, and also a roofer with my father since I was barely old enough to walk, I have been around roofing and building for about 52 of my 56 years. I worked on my first slate job when I was about 23, and we have worked on thousands of tile, slate, metal and shingle roofs over the years. Occasionally of course, some of them have had round or partially round areas to roof and these are always a challenge, but a welcome one. I believe it separates us into a different level of roofer to be able to do this work and do it well, but I feel inclined to give a few tips that I have accumulated over the years that will make the work much easier and less daunting for all of us.

Going over the memory banks, I counted quickly up to about 16 different cones or round roofs I have done and I am sure the total is about 50 if I could remember all of them. These were done mostly in shingles, about half, 4 or 5 in standing seam metal, 4 or 5 in slate and the rest in concrete tile. Two years ago, we were building an addition on a customer's house and I got to build a cone roof as a new entrance to the house that matched the original cone turret we had roofed with concrete tile about 18 years prior. The point is that I have been able to work on all facets and in many different mediums of round roofs and the principles involved in building a round roof also help you when you are trying to roof one.

In the spring, 2005 issue of Traditional Roofing, Joseph Jenkins summed up roofing a cone with slate in a very succinct manner. "The fact that every slate must be trimmed at an angle on a small turret such as this indicates that more time and fiddling around are necessary to get the job done right." The good news is that a lot of this "fiddling" can be done right in your shop out of the weather if you wish, and you only need to know THREE different measurements on any cone roof to do it. This applies to any type of roofing material you may be using, and the pieces will come out exactly the right shape and size and angle to fit the cone. If this interests you, read on as we must first delineate the principles and the logic behind this statement.

Any pitched roof, unless it is just a shed roof, has at least two sides. If you make it a hip roof, it has four. If we assume this building is a square (no matter what size it is) the apex of the different ridges is also the center of the building. If you clip off the corners of the hip roof at a 45 degree angle, you get an "octagon" or an 8 sided building or roof — a "stop" sign. I am sure that many of us have worked on bay window roofs and these are just partial octagons. If you were to break down an octagon roof in half again, you would have a roof with 16 sides and on and on. Basicly, a "round" roof is just a straight hip roof with an infinite number of sides on it. To successfully roof a round roof, you



MUST first be able to use and read a tape measure. You have to know exactly where you are on a roof at all times and where you are going. "Ready, FIRE, Aim" doesn't work too well on a cone!

Crookston's Upright, Inc. constructs a new conical roof (top) and restores an old one with slate (above).

A note on safety is also in order here. Most cone roofs will probably be an accent to a roof and probably will be steep and higher off the ground. If they are, I would highly recommend setting a scaffold around the bottom of the roof so that you can access all of the areas and also give yourself a working platform to store your pieces and to allow you to lean a ladder onto the roof to support yourself on the cone while roofing it. Roofing a cone is more expensive than a regular roof, so add enough into your figures to allow for scaffolding. It is faster and cheaper in the long run and will make the job come out better too.

THE THREE MEASUREMENTS!!!

For any cone roof, you need to know the: 1) rafter length, 2) the diameter of the cone, and 3) the widest piece of roofing you are going to use to roof it.

If you are using shingles and the roof is a big one, you would probably start with a full shingle. If they are metric laminated shingles, this would be about one meter long. If they are 3-1's the longest piece would be 12 inches as that is the length of one tab. With slate, the widest slate would be around 12 to 14 inches, but it could be less if the cone is a tight radius. The diameter of the cone is used to determine the distance around the bottom of the roof. If you can measure around it, do so. If not, the constant proportion of a circle to it's diameter is called pi, and pi is the number 3.1416…..it goes on forever without repeating, but for our purposes if you just multiple the diameter of the circle by 3 and then add a foot or two you will be close enough. You use this number to determine the number of different pieces of each size you will need to go all the way around the cone.

If the diameter is about 20 feet, you would multiple 20 by

3.14 and you would get 62.8 feet. In my previous example we could multiply by 3, which equals 60 and add a couple of feet and be at about the same place. If you are using slate and the widest slate you have is 12 inches or one foot, obviously you would have about 63 slates in each course as you worked up the cone roof. If you are using laminated shingles, the longest piece you want to use will be determined by how fast the roof curves around. The smaller the piece you start with, the “rounder” the finished product will appear. We are making “PIE” pieces of roofing to cover the cone.

NOW we are ready to make our jig to make our pieces to fit the cone. If the rafter length previously measured was 15 feet, and the widest piece of slate to be used is 12 inches, we would take several pieces of plywood or OSB and lay them end to end on the floor. Measure up 15 feet from the bottom centered on your boards and establish a point. On the bottom from this center line, measure out 6 inches on both sides and strike lines from these marks to your center point at the top. This is the exact shape of one section of a pie that is 1/63 of your turret. I will normally cut out the triangle with a circular saw and mount the pieces to a piece of 2x6 so that I can place it on a set of saw horses to work at waist height to cut the pieces.The bottom of the jig is the bottom of the slate; including the overhang. If I am cutting shingle pieces, I will also install a piece of drip edge on both sides to give an easy surface to trim the shingles against. Allow for the length of the overhang of the drip edge if you do this.

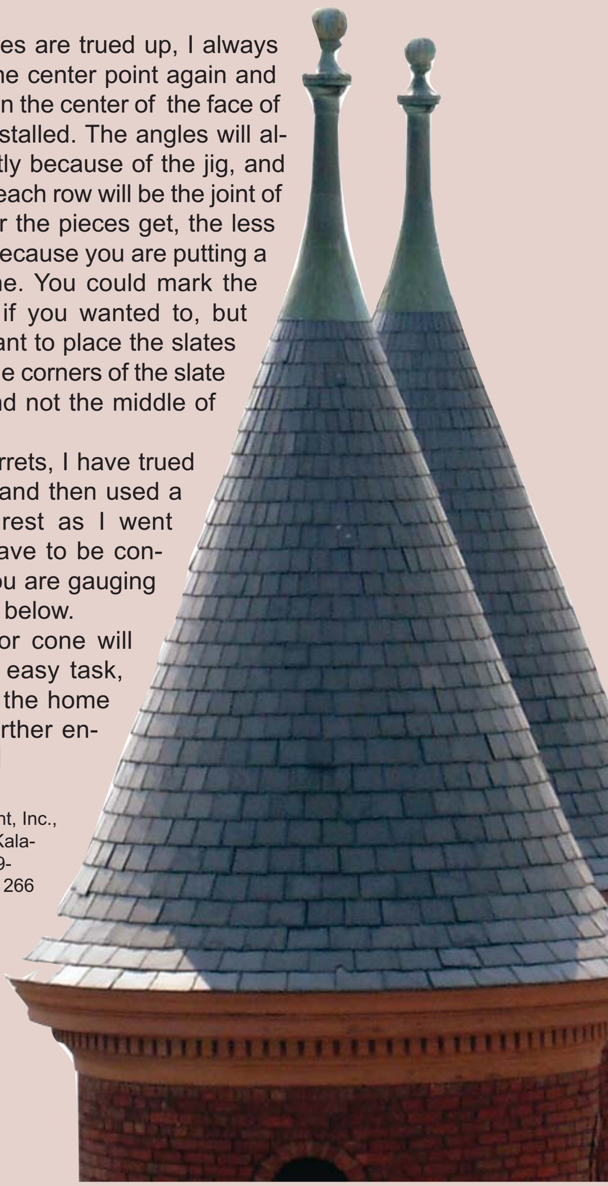
Next, we mark lines on the jig at the location of either the top or the bottom of the tiles or shingles. If we are using 20 inch slates, the exposure with the head lap would be 8 ½ inches so if we were to mark the tops, the first mark would be at 11 ½ inches from the bottom of the jig for the starter to allow for the overhang and the headlap, and every 8 ½ inches from there. Mark the marks all the way across and number them on your jig from #1 to # 21. Now, lay an individual slate to the line and scribe or scratch the sides from underneath using the sides of the jig to guide you. Flip the slate on its back and punch the holes in it before you trim it to size. Depending on the size of the slate used and the pitch you may have to trim the top shoulders of the slate a bit also to allow the next row of slate to sit flat on the roof. If you are cutting shingles, don’t worry about clipping the corners as they will bend to match the roof. In the example shown, we would cut 63 pieces and number them with a crayon as you cut them (#1). Do the same for the second row and so on making sure to number them as you go. They are all close in size and it can get confusing. Make the same number of pieces for each row.

Once all of the pieces are cut, it is a relatively simple process to install them on the roof. I use a string or chalk line tied to a nail centered on the peak as a guide to mark the middles of the slates where the two slates in the next row meet. The angles on the slates cut on the jig will exactly match each other and it is easy to follow the coursing. You may have to adjust the last couple of slates of each row where they meet, but that is relatively simple. As far as keeping everything horizontal, I just use a tape or a string pivoting from the top nail or center point. No matter how steep or long the rafters, that measurement is your radius. I would true the slate to the cone on the first course from the bottom. You want to have a consistent overhang with the starter course and the first full piece of tile. If for whatever reason the cone is not perfect, the second course of tile, radiused from the top center point and marked at the exposure line of the first course will be. You have to make sure that if there is any error in the "roundness" of the turret, that the maximum exposure still allows for the proper headlap.

After the courses are trued up, I always swing a line from the center point again and mark the exposure in the center of the face of the slate already installed. The angles will always match perfectly because of the jig, and the lowest point on each row will be the joint of the tile. The smaller the pieces get, the less deflection there is because you are putting a flat piece on a cone. You could mark the tops of the slates if you wanted to, but again you would want to place the slates on the line so that the corners of the slate touched the line and not the middle of the top!

On shingled turrets, I have trued the bottom course and then used a gauge to set the rest as I went around. You just have to be consistent on where you are gauging from on the shingle below.

A metal cap or cone will make the peak an easy task, and I normally sell the home owner a finial to further enhance the “look.”



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