8" Brocade Crysanthemum Shell

Figure 1: Cotton seeds in a mixing bucket.

Figure 2: Cotton seeds dampened with water, but not soaked.

Figure 3: Adding meal powder to the damp seeds.

Introduction:
As spherical shells increase in size, the internal volume to be filled with burst charge increases by a power of three. However, the amount of powder required to break these larger shells does not increase by a factor of three, thus a way is needed to reduce the amount of actual burst charge while still filling a large volume. This is commonly done by the use of "filler," which is any material that is coated with the burst charge in order to increase its volume without increasing the actual amount of burst charge.

The larger a shell gets, the larger the filler needs to be. While rice hulls work for smaller shells, something with more volume is desireable for bigger shells. This can be seeds, pieces of cork, beans, popped pop corn or any similar sized light weight material that powder can be made to stick to.

For this single petal 8" shell, either cotton seeds or puffed rice cereal are coated with ball milled meal powder to make the burst charge.

Cotton Seed Break Charge:
Cotton seeds make an ideal choice for burst charge filler for larger shells. They are a good size, cheap, light weight and they have a fuzzy coating that easily picks up the meal powder. The only drawback is they are not exactly easy to come by. There are no suppliers that sell them in hobbyist quantities that I know of, which means you have to be resourceful in finding them. This means you have to get on the internet and search for farming companies that sell cotton seeds, then convince one of them to sell or give you a "sample."

While cotton seeds sell at a very low price per pound, the companies that sell them have minimum container sizes that are prohibitively large for the hobbyist. Even a small scale supplier wishing to resell cotton seeds would have a difficult time storing a 40 foot trailer full of cotton seeds, which is a typical minimum order size.

Obtaining a sample from a supplier may get you 100 pounds of cotton seeds at no cost at all. Cotton seeds can actually go bad in storage by sprouting, which is caused when the seeds have too much moisture. It is important to find out how long the seeds have been stored before getting any large quantity. If your supplier has had them around for a year or more, then you don't have to worry about sprouting. Otherwise you will have to dry your seeds in an oven to remove any moisture.

Coating Cotton Seeds:
There are a few methods I have heard of for coating cotton seeds. One method involves making a meal slurry and then pouring it onto the cotton seeds and stirring it around. Some builders report that this method can result in a big glob of entangled seeds if you are not careful. A similar method with similar complaints involves adding the dry cotton seeds into a tub of meal

Figure 4: Mixing in the meal by hand.

Figure 5: Finished cotton seeds are completely coated with meal.

slurry.

Because the cotton hairs on the seeds tend to get matted down and entangled with each other, the ideal process allows the seeds to be coated while also keeping them separated. This is better achieved by first wetting the cotton seeds and then introducing dry powder to them and stirring them around.

Figure 1 shows a large plastic bucket filled with dry cotton seeds to be coated. Start by spraying the seeds with water containing 14% alcohol, stirring them as you spray. You don't want to soak the seeds in a bucket of water because then they will be overly soaked and stick together. By spraying them you will be able to control the amount of starting dampness, which will be the point when the cotton is saturated and the seeds just start sticking to the bucket walls and your hands (see Figure 2).

Once the seeds are dampened, introduce the dry meal powder containing 5% dextrin as shown in Figure 3. Incorporate the powder by stirring with your hands, then keep adding more until the seeds stop picking up the dry powder.

The powder is not added onto the seeds in any particular ratio as it is for other burst charge types. It is added until the seeds are completely covered so that no white spots are visible, as shown in Figure 5. If the seeds stop picking up powder before they are fully coated, it may be necessary to spray them again before adding more powder.

Another method for coating the seeds is to use a star roller to keep from having to stir them by hand. The seeds are tumbled in the roller and alternately hit with water spray and powder.

Once the seeds are coated, lay them out to dry on sheets of newspaper or screens.

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