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AUTOPSY

8" Gold Peony Ball Shell

Manufacturer:	*Sunny*
Shell Weight:	*2974g*
Lift Charge:	*219g 3FA black powder*
Burst Charge:	*938g BP on cotton seed*
Stars:	*5/8" to 3/4" dia. round stars*
Shell Type:	*8" ball shell, single petal peony*
Hemi I.D.:	*6-3/4"*
Hemi O.D.:	*7-3/8"*
Case Thickness:	*3/16"*
Time Fuse:	*Dual chinese time fuse, 6 sec delay time*

Figure 1: The platic bag of lift with time fuse tied in was pasted onto the shell.

Figure 2: Time fuse crossmatched with split & tie method.

Autopsy Report:
One of the best ways to obtain a starting point for building your own ball shells is to analyze the construction of real commercial shells. While there will be slight differences in your own paper, paste and burst charge strength, imitating a commercial shell for your first attempt will still get you very close to what you want. As you progress onto larger shells that require substantially more materials to build, keeping trial and error to a minimum is very desirable. It is for this reason that Passfire Labs provides you with these Autopsy Reports.

This month we look at a simple 8" ball shell with a single petal of gold flitter stars. The shell was lifted using the typical plastic bag filled with 3FA grain powder, which is tied onto the leader and held onto the bottom of the shell with a few layers of pasted paper. Figure 2 shows the method of cross matching that was used. The time fuse was split down the middle rather than pierced, and several strands of match were inserted and tied into place. I found the string to be rather loose and easily pulled off by hand, making the probability of passfire failure higher than it should be. I would like to think this was an isolated case of poor quality on Sunny's part.

Figure 3 shows that the shell was loaded just as one might expect: stars around the wall followed by a tissue paper liner filled with break charge. I was surprised to find considerable size inconsistency between the stars. Perhaps since these are not color changing stars, it is not worth the effort to screen the stars as accurately as what I am used to seeing.

The break charge consisted of meal coated cotton seed. The ratio

Figure 3: Black powder on cotton seed as the break charge.

Figure 4: Single color stars ranging from 5/8" to 3/4".

of meal to cotton seed was measured at 1:2, meaning 1g of meal for every 2g of cotton seed. Because cotton seeds tend to clump together, it is more difficult to apply burst charge to them in a controlled ratio. The typical procedure involves preparing a slurry of meal and working in the dry cotton seed. Once they are saturated with slurry, they are then dusted with dry meal until the point that they no longer stick to each other. Because the burst charge volume of a single petal 8" ball is so high, you do not need a high ratio of meal to cotton seeds in order to break the shell.

The stars were meal primed and burned with a very aggressive, brilliant gold flame that shot out branching gold fragments (not to be confused with gold sparks). The composition was a dark purplish/brown color and looked as if it contained a good amount of powdered iron or steel. No visible core was found at the center of these stars. Slight imperfections in the roundness of the stars suggests that they may have been rolled from smaller pumped or cut stars as the core. This type of shortcut is easy to get away with when stars are not color changing.

The contents of this shell were repackaged into a new set of hemispheres and pasted in with 14 layers of 70 lb kraft. The lift quantity was decreased to 185 grams rather than the original 219 grams supplied with the shell. This was due to the fact that home-made lift equivalent to Goex was used in place of the weaker black powder used by the Chinese. The shell was fired and observed to achieve the original commercial quality performance at the correct altitude.