

Fireworks Displays—Abnormally Dangerous Activity ? ? ?

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Most of the fireworks display industry is aware of the ruling of the Washington state supreme court, which declared the conducting of fireworks displays to be an abnormally dangerous activity.^[1] In part, that ruling was based on their considered opinion that, by their very nature, fireworks displays could not be performed safely. One ramification of declaring fireworks to be an abnormally dangerous activity is that in the event of an accident, negligence is no longer a consideration regarding liability. In legal parlance this is referred to as “strict liability”. Under normal liability, in order to win a judgment it must be shown that a defendant was negligent (i.e., failed to conduct himself as a “reasonable” person would have under the same circumstances). Thus, if a display operator and crew always do what reasonable persons would, they would not be negligent and would be victorious if sued. (At least this is true in theory.) However, under strict liability, about all that a plaintiff needs to prove in court to win a judgment is that they were injured. Obviously, this is a far easier task, and a situation likely to have ramifications affecting insurance rates and a sponsor’s willingness to put on displays.

Obviously the situation in Washington state is of concern for display companies doing business there, but the concern extends beyond Washington state. Courts in other states are being petitioned by plaintiff’s attorneys attempting to win similar rulings. Legal precedence being what it is, the decision by the Washington state supreme court is being cited as part of the legal argument in other states. For example, in Arizona a judge recently ruled that fireworks displays were “inherently dangerous”, thus making a sponsor liable for the misconduct of the display company it hired.^[2] In part the finding was based on the Washington state case.

Since display companies are concerned about having fireworks displays declared an abnormally dangerous activity it would seem

foolish for any display company to act in a manner that would make it more likely that the strict liability standard will come to be applied in more states. Even if there might be a short term gain for the company, the long term result will hurt that company along with everyone else in the industry. This is one reason that many in the industry have applauded *NFPA-1123 (1990), Code for the Outdoor Display of Fireworks*. By addressing more display practices, in greater detail, and often with a higher standard of performance, the code helps to make it less likely that an individual display company will engage in conduct that harms the entire industry. For this reason I was surprised recently by the actions of a major display company. The following account is presented in the hope that similar conduct, on the part of this or any other company, will be discouraged. Because some of the details of the incident may be in dispute, and because it is only the type of inappropriate activity that needs to be discouraged, the company, display dates and the site will not be identified.

The incident involves a display in which most 8, 10, and 12-inch shells were fired from paper mortars placed directly into very moist sand. The contract for the display required following NFPA-1123, which requires that:

“2-3.3.1. Under conditions when paper mortars may be damaged by placement in damp ground, paper mortars shall be placed inside a moisture resistant bag prior to placement in damp ground.”

It was about 34 hours before the time of the display when the moisture damage problem was identified and confirmed by inspection. Except for the opening barrage and finale, about 80% of the display had already been loaded. The company representative on site refused to acknowledge the problem and thus refused even to attempt to limit its seriousness by removing the mortars and placing them in plastic bags as

clearly required by NFPA code. Instead, the display company representative raised the following objections and reservations:

- The code states “damp ground”, not damp sand, and thus it does not apply;
- This is the way the company always does it, and they have never had a problem;
- If the mortars are placed in plastic bags, they will pop completely out of the sand and up into the air, thus possibly falling on and damaging other equipment;
- The moisture had/would penetrate through no more than two or three layers of paper;
- There was not enough time left to correct the problem;
- If the company were made to put the mortars in plastic bags, they would refuse to fire them for “safety” reasons;
- The use of plastic bags was itself a safety problem because they would catch fire from sparks, and there would be premature ignitions;
- Those who wrote the NFPA code lacked the experience required to understand the problems associated with mortars in plastic bags;
- Any minor loss in strength had already occurred and placing the mortars in plastic bags would not help and might even make the problem worse;
- Based on their reputation, the company would guarantee there would be no problem with the performance of the mortars;
- Using plastic bags in damp sand was not a standard industry practice;
- If they were forced to put mortars in plastic bags, and then fire shells from the mortars, they would not accept any responsibility for the consequences;
- It was too dangerous for the crew to pull the shells from the mortars in question so that the mortars could be put into plastic bags;

- If the shells were pulled, their fusing could be damaged to such an extent that they could not be safely fired.

The display site inspector was unusually knowledgeable for an “authority having jurisdiction”; he had many years experience performing displays, inspecting displays, and investigating display accidents. For the following reasons, he had added concern regarding the moist sand issue:

- About five years earlier a spectator had been injured on that site as a result of a paper mortar that had blown-out because of being placed in moist sand;
- Most of the 8, 10, and 12-inch shells to be fired from the mortars in this display were chain fused in numbers exceeding the limits set by NFPA-1123 in paragraph 2-3.3.6;
- The largest caliber mortars were shorter than recommended by the NFPA-1123 in paragraph A-2-3.6.3;
- The chained mortars were in plastic garbage cans, which were weaker and, because of the shape of their bottoms, were more likely to tip over than metal drums;
- The chain-fused, garbage-can mortars were immediately adjacent to racks that were not staked to the ground, did not have feet attached, were only sparsely interconnected using 1" × 2" lumber, and contained ABS plastic mortars (not HDPE) with no spacing between the individual tubes.

Despite the protestations of the display company representative, it was ordered that the mortars be pulled and bagged to halt the further absorbing of moisture. However, after about 25% of the mortars, those in the wettest sand, were bagged, and the inspector had left the site, the crew reverted to loading and wiring the rest of the display. By the time it was discovered that the mortar pulling and bagging had not been completed, it clearly was too late to be done without delaying the display at least one day. Because of the desire (need) to not delay the display; the fact that the local fire department had been on site and issued the final permit without an inspection; and the feeling that spectators were unlikely to be injured because

the separation distance was a little greater than that required by NFPA-1123 for non-chain fused 12-inch shells, the sponsor decided to allow the display to proceed.

The display was conducted and, as feared, there were a number of mortar failures and associated problems. Luckily, there were no spectator or crew injuries. Following the display it was discovered that 23 of the mortars in question had failed. (The count ranged from 19 to 29 depending on who did the counting; I counted at least 23, but there was some question about what parts came from which mortars.) Essentially all of the failed mortars were the ones that had not been bagged. All of the failed mortars had ripped up from the bottom to the approximate level of the sand or they had failed from blown plugs because their fasteners tore out. In no case was the failure a result of shell malfunction within the mortars (confirmed by close observation during the display). All of the failed mortars were visibly swelled and water could be squeezed from their walls by pinching with finger pressure alone. In examining the 12" wooden mortar plugs, it was found that some had been made from about a 6" length of tree trunk (nearly the correct diameter but not completely round) with the bark still in place and others were made from only three 1½" thick plugs for a total thickness of 4½ inches. In all cases the plastic garbage cans holding the failed mortars had split open and tipped over. In several cases adjacent garbage can mortars and racks had been tipped over, and their mortars realigned and racks destroyed. Luckily, in only one case did a shell fire horizontally from a tipped mortar and travel a significant distance. In many cases the shells from the blown mortars still fired to a reasonably safe altitude. In at least half of the cases burning debris from the low breaking shells fell to the ground, some fell beyond 840 feet from the mortars, but none within about ten feet of spectators. In one case a shell fell back to the ground, broke open producing a substantial fire ball and damaging some wiring. In short, considering what could have happened, they were very lucky. Following this article are some photographs of the scene after the display.

Following the display the company representative proclaimed that the loss of 23 large cali-

ber paper mortars (about 10% of those actually fired) was normal for any display company.

Before concluding by making my point for this article, let me acknowledge that:

- The display was very well received by the spectators;
- The shell count was large and for the most part the quality was good;
- The choreography was good; and
- The crew performed heroically under absolutely miserable weather conditions, including several days of intermittent showers and pouring rain, separated by periods of incredible heat and unbearable humidity.

The point of this article could have been that:

- It was inexcusable to have put the public at this level of unnecessary risk;
- It was inappropriate to frustrate a sponsor and authority having jurisdiction by inventing lame excuses and rationalizations to avoid taking needed corrective action; or that
- Having agreed to take corrective action, it should have been completed, and their failure to finish the task should not have been concealed.

These could have been the reason for this article, but they are not. The point is that it is a serious disservice to the fireworks display industry to claim that such poor conduct and the resulting high rate of equipment failure is typical of the best the industry can do. This is tantamount to an acknowledgment that fireworks displays cannot be performed safely, and thus supports the contention that fireworks displays are an abnormally dangerous activity. If this were true, it would be one thing, but it is certainly not true. When a display company refuses to take responsibility for its activities and characterizes its shameful performance as the norm for the industry, it serves to inappropriately and unnecessarily injure the whole display industry.

Acknowledgments

The author's gratefully acknowledge the safety officials involved in this incident who reviewed the text for accuracy; however, we have not named them in order not to reveal the site of the display.

References

- 1) M. Langenfeld, "Troubling Precedent", *Fireworks Business*, No. 91, 1991.
- 2) Miller and Latham v. Westcore, Case No. C-42919, Court of Appeals, State of Arizona, Division 1, Wm. F. Garborino, Judge.

