

## Firework displays

### Essential things for organisers to know and plan

When planning a professionally fired firework display there are lots of things YOU need to think about to ensure the event is safe and enjoyable by all. It is, unfortunately, far too easy for inexperienced “professional” display companies to “offer the World”, but create huge potential problems for themselves, you as event organisers, and of course the public watching the display.

We have broken down the event into 3 parts: -

- The planning of the event
- The event itself
- After the display has finished

#### Planning the event

The most important thing in planning any event is the site – the site will determine what fireworks will be suitable for the display and will also determine (alongside meteorological conditions on the night) whether the display needs to be curtailed or even cancelled completely.

There is a huge difference between, say, a display fired on an island in the middle of a lake, and one fired from a city centre rooftop.

Any company that is tendering for an event should visit the site and produce a plan for the display based on: -

- The site itself (e.g., on grass, on a concrete rooftop etc)
- The distance from the display site to the audience, to structures, to carparks etc – they may consult tools like Google Earth but will rely on you for up-to-date information too
- The prevailing wind direction and any local weather effects and the “most likely” and “worst case” scenarios
- The requirements for the display (e.g., to music, low noise etc)

The display company will be able to provide you with: -

- Copies of their risk assessment for the display including site and product specific information
- Copies of their insurance – which if they are BPA members will be for a minimum £10million public liability insurance
- Copies of their Health & Safety policy, their Environmental Policy, and details of the environmental impact of the display – including aspects relating to carbon footprint, the environmental effect of the display (and of the combustion by-products) and the noise.
- Details of their training (including ADR driver training and BPA training of firers and Senior Firers)
- Details of the Senior Firer who will be on site for the display (this isn’t always the same as the person dealing with your display beforehand – who is usually the company’s display manager).
- Details of, and references from, previous displays, particularly those with similar setups (e.g., from barges or rooftops)



- Details of how the display may be affected by different weather conditions and when it may be necessary to curtail or even cancel the show. Please respect this – they are the experts and although in an ideal World everyone would like to fire the “A” show – it may be quite appropriate, say, to plan the display on the basis of the prevailing wind, it may be necessary to fire a “B” show if the wind is very strong or from an unusual direction

**We recommend you always use a BPA member company to organise and fire your display – they will have signed up to the BPA Code of Practice and will have all necessary insurance and skills in place.**

Once you have all this information, perhaps as part of a tendering process, you will be able to gauge the most appropriate company for your display – the decision should rarely be made on price alone but should consider all the other aspects noted above. It is extremely difficult to unambiguously compare displays – it is not a matter of “counting widgets”! So much will depend not only on the costs, but on artistic design and a proper understanding of your needs as well as the absolute need for safety.

The company will also consider what weather conditions might mean they need to curtail or even cancel the display. BPA members have adopted the ShellCalc© program to assist them – other modelling methods are available.



#### A note about noise

Silent or whisper displays, despite their names, are an impossibility. Any firework that is propelled into the air or bursts in the air will produce some noise, and some of the images of so-called “silent fireworks” are simply nonsense. Of course, it is possible to design and fire a display where noise is minimised, and in situations where noise could be a problem (near stables for instance) there are things that can be done to minimise any potential distress. These include

- Suitable choice of fireworks
- Making sure that those who might be affected are aware of the display
- For situations like stables, sedating animals and masking the transition between the time before the display and the display itself (for instance by playing music)

There is, unfortunately, a lot of misinformation circulating not only about the noise levels of fireworks, but what might be an acceptable level. These claims are simply unscientific – sound levels reduce as the square of the distance from the source of that sound, and to quote a sound level without a distance that relates to where the sound is to be heard is meaningless.

120dB is the maximum sound level permitted at the minimum viewing distance for fireworks available to the public. However, at a display it is rare that this distance is the actual distance the audience are located, and the sound level is far from continuous. So, at the following distances the sound level is approximately (and it does depend on factors such as wind and environment): -

- 116dB at 32m
- 112dB at 50m
- 108dB at 80m

However, as a comparison (and using figures widely quoted – mostly without distances cited):-

- 90dB (a figure often suggested by anti-firework activists) is approximately the noise level of a hair-dryer – presumably measured within 0.5m of the ear
- 90dB is the typical sound level of a petrol lawnmower – measured at 1m
- 110dB is the sound of a trombone – presumably measured at the ear of the performer
- 115dB is the typical sound level of a cheer at a large sporting event
- 120dB is approximately the sound level of a police car siren – measured, we presume at the kerbside of a road
- 120dB is a typical sound level for a rock concert – for the duration of that concert

Please discuss any concerns you have with the display company but importantly also inform anyone who is likely to be affected of the event. If they are fore warned they can make provisions to minimise the impact, if they don't know about the event, they are much more likely to complain!

### At the event

The display crew will arrive at your venue at a time and date agreed – obviously large displays may require several days rigging and testing, whereas smaller events may only require the display crew to arrive on the date of the event itself.

The display crew will setup according to the site plan decided by the display manager – but you should ensure that you inform them of: -

- Any changes to the site layout
- Any new features that could affect the safety of the display

They will then, having checked that it is still safe to rig and fire the display, proceed to setup all the fireworks, fuse them as necessary and carry out testing.

They will also consider the weather forecast for the time of the display and may, if necessary, remove certain items to maintain the risk of the display “as low as reasonably practical”. Please do not try and apply pressure to them to fire fireworks that are not appropriate if the conditions have changed.

Proper communication between you as event organisers and the display crew is essential – both at this stage, and critically during the display itself. If incidents occur it is often difficult for the display crew to observe them and to act appropriately. Consider things like: -

- A change in the weather – particularly wind and fog
- People entering “sterile” areas
- An incident somewhere on site which means the display should be stopped or abandoned

During the display the Senior Firer has complete authority to stop at any time if the safety of their crew, the public, structures, or anything else is compromised. Please do not try and insist “the show must go on”. However, they may well also rely on information from you to make that decision – so ensure there is proper communication between you as event organisers and the display crew.

In addition, the Senior Firer will have determined (alongside the display manager) a set of criteria for curtailing or cancelling the display. These criteria will depend on the nature of the site and the fireworks chosen as appropriate, but there are conditions in which it will no longer be safe to fire the “A” show.

## After the display

Immediately after the display there will be a “cooling off” period when the display company checks that all fireworks have been fired and deals with any that have not.

You should communicate with the display company and: -

- Ensure that there has been no incident on site
- Report any issues you have identified
- Arrange to meet for a post-display debrief as necessary

If there has been any incident, please report it to the Senior Firer as soon as possible. Obviously the more serious the incident the more important this is done – even during the display itself.

Any incident is important, and you and the Senior Firer should determine: -

- At what time the incident occurred
- Where exactly it occurred – draw a site plan and mark things clearly
- What the weather was at the time of the incident
- Details of any witnesses
- Etc

The display crew will clean up the firing site, having made safe any unfired or misfired fireworks, and will proceed to load their vehicle(s) for transport back to their base.

## Finally...

Much of the work on ensuring a great firework display is done before the event itself. Please make sure that the company you are using has the experience and skill to assist you in achieving this.

**We hope you have a safe and successful event.**

If you need any more information on the BPA or its activities, please contact

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