

## Environmental effects of fireworks

Several event organisers and Local Authorities are rightly concerned about the possible negative environmental effects of fireworks and in some cases have attempted to cancel events on the basis that all firework displays produce unacceptable amounts of atmospheric pollution and noise.

In fact, we have been able to demonstrate that in most cases this is simply not the case – and that in fact the atmospheric effects of the combustion by-products from burning fireworks is tiny in comparison with other features of the event – such as people travelling, or the use of generators.

### Atmospheric pollution

It is critical to realise that the chemicals inside fireworks are not released per se to the environment – it is the combustion by-products that are released. For instance, whereas gunpowder (blackpowder) contains Potassium Nitrate, Sulphur and Charcoal – what actually is released when the firework functions is a mixture of non-metallic oxides (for instance Carbon Dioxide, Nitrogen and Sulphur oxides) and Potassium salts (such as Potassium Sulphate and Potassium Carbonate).

Hence it is possible to compare the production of these (and other combustion by-products) to the gasses and solids produced by vehicles bringing the audience to a display, or to the output from onsite generators.

A recent study undertaken for a major event in London demonstrated that the amount of Nitrogen Oxides and Sulphur Dioxide produced by the combustion products from the display was only about 1/300<sup>th</sup> of that produced by the various means of transport bringing people to and from the display itself. In terms of carbon emissions (mostly Carbon Dioxide) the amount produced by the display was only equivalent to a standard car driving about 250km. In this respect it can be clearly seen that the actual amount of these gasses is insignificant in terms of the overall event footprint.

The carbon emissions from this display equated to only a few tens of minutes of running a single 15kVA generator – in fact there were dozens of such generators at the event for safety messaging and lighting purposes.

Indeed, the suggestion, by some, that replacing the fireworks with drones would have, at best, minimal impact of the environmental effects of the display and, of course, introduce new safety and environmental concerns of their own.

In terms of smoke and particulate matter we have also calculated the impact of the displays. All fireworks produce some smoke – although the industry is working hard to minimize smoke production – much of it is highly soluble and in normal conditions widely dispersed. A small amount of non-soluble smoke may be produced but research has shown, again, that the quantities are very small and essentially no harm to human health.

We have developed an environmental calculator for the industry which is being used to calculate the environmental effect of displays and the necessary carbon offsets.

### Noise

All display fireworks produce some noise – those who claim it is possible to fire a “silent” aerial display are being disingenuous at best. The important factors to consider are what fireworks are to be used at any particular venue and to ensure that people who might be particularly affected (or those in charge of susceptible animals) are forewarned so that they can take appropriate action.

Whether it be retail consumer fireworks fired in a domestic setting, a small display for a local primary school, or a major display attracting hundreds of thousands of people the same principles apply:-

- The right fireworks
- For the right place
- At the right time
- And let people know

The noise effects of fireworks generally relate to the “bangs” that they produce, and undoubtedly there are some who may be particularly affected by such noise. However, for instance, we know that wildlife (and most domestic animals and indeed young children) only really react to the break from quiet to noise. Displays near water may see ducks take flight when the display starts, but they return during the display once they are acclimatised to the noise. For horses, for instance, playing increasingly loud music to them in stables to mask this break between quiet and noise is very effective – but of course once the display time has been agreed it must be adhered to.

Again, we have produced a calculator not only to plot the potential debris “fallout” from a display but also to graphically show where noise levels may be exceeded in various wind conditions.

## Conclusion

Education, notification and information are the key to running a safe and appropriate display – there are tools to assist in this process and responsible display companies will choose the appropriate fireworks to use to suit the venue and the local environment.

The environmental effect of a firework display is minimal – the Disney corporation (who fire a display at their sites 365 days a year) have done extensive monitoring of any changes to the flora and fauna of the local environment and have found these changes to be minimal.

It is, we believe, possible to fire a display almost anywhere by suitable choice of material – and local authorities and event organisers should be assured that responsible display companies will minimize the impact of their displays to ensure that events are not jeopardised now or in the future. However, it is also vital that organisers and licensing authorities use reliable, quantifiable information and are not adversely swayed by ill-informed media and lobby anti-firework groups.

For more information contact:



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