DEKRA Insight

COLOR RUNS: ONLY FUN?

DEKRA Insight's **Joseph-Marc Francois** and **Stephen Rowe** discuss the hidden dangers of this popular sporting event and offer recommendations for protecting yourself, your friends, and family.

The traditional Indian Holi, the spring festival – or the festival of colors – signifies the victory of good over evil and is celebrated by Hindu's by the]liberal throwing of highly colored powders over the participants creating a striking spectacle. The festival has, in recent times, spread to parts of Europe and North America as a spring celebration of love, frolic, and colors – but has also seen a recent substantial rise in other areas – in night clubs, "rainbow runs" and other events.

Ironically, there is a potential hidden evil in this celebration of the victory of good that has recently manifested itself.

The base of many of the powders is corn starch with the colors given by adequate pigments. Some of the base powders are talcum powder (an inert mineral).

Corn starch is an organic powder. If a cloud of such a powder is generated, it can be ignited under specific conditions and propagate a fireball or flash fire. Such an event occurred at the Formosa water park (Taiwan) on June 27th: a massive amount of powder (several tons, according to the information we had) was sprayed on the partygoers. The cloud ignited (many ignition sources can be found in such conditions: electric spark, hot surface, lighter flame . . .) and propagated a flash fire with flames at several hundred degrees. On 31st July, the appraisal was terrible:

- Ten people had passed away
- 200 were still in intensive care.

If the base powder is talcum powder, it is not likely to present such a risk of flash fire as this dust cannot be ignited when dispersed as a dust cloud (although the color pigments can impart flammability). An internet search quickly identifies that the majority of the powders are corn starch based with manufacturers claiming that that the powders are "100% safe". The claimed safety relates to toxicity, not to dust explosion risk, with many manufacturers backing up their claim by quoting EC regulations related to cosmetic products and toys... none of which consider dust explosion risks.

In some cases, the colored powders are classified as 'nonflammable' but only because the tests required for the classification of the material do not take into account the fact that it can be ignited when dispersed in the atmosphere as a cloud. This 'dust explosion' phenomenon is well known by industrial companies (chemical, pharmaceutical, food, etc. industries) and many serious – multiple fatality – accidents have occurred in the past, and still occur.

Colored events are still organized – in fact, with increasing scale and frequency – like the "colored run night" in London on 5th September or the "Color run" in Marseille on 4th October.

Even if the risk of a dust cloud explosion like the horrific fire ball in Taiwan is low, it can't be neglected. Controlling ignition sources in such an atmosphere is, at best, challenging so the probability of ignition cannot be ignored. The potential for a dust explosion to occur also depends on the delivery mechanism of the powders. In most events, powders are thrown in the air by hand – limiting the amount of material dispersed and hence limiting the extent of the potential flammable dust cloud. In the Taiwan incident, the powders were dispersed by large volume mechanical dispersal systems which will give rise to much more extensive flammable clouds – and hence significantly increase the probability of the cloud "finding" an ignition source.

What Should We Do?

The overriding aim should be for manufacturers to produce, wherever possible, non-flammable powders for such events. Organizers should challenge manufacturers on this aspect and help to drive them towards non-flammable solutions.

If corn starch based powders are used, our view is that high volume mechanical dispersal systems must be banned – with only hand throwing of the powders permitted. Even then, there is a residual risk of localized flammable clouds particularly in enclosed spaces. Organizers must be cognizant of this residual risk.

At the root of the issue, we are currently working with manufacturers to fully assess the dust explosion properties of the powders and to help them in finding and using materials that do not possess this dust explosion potential (example: talcum powder based products).

In the meantime, our suggestion to participants is to be very wary of the risks. Challenge organizers on the properties of the powders – "are they corn starch based", "are they dust explosive", "are mechanical dispersal systems used", etc.). Where mechanical dispersal systems are used, our advice is soundly to avoid participation in such events – unless the organizer can produce data from valid methods for dust explosion classification – which demonstrates the non-flammability of the powders when in suspension in the air.

If in doubt, DEKRA Insight can provide a free advisory service to event organizers, manufacturers and participants to advise on risks.