Risks in the Spotlight
Volume 2 (11-15)

The Insight Team
Emergency Planning College
The Insight Team
- Key author: Mark Leigh
- Editing and graphics: Helen Jubb

Acknowledgements
- The author wishes to thank Beverley Griffiths for her input on Risks in the Spotlight 14.
From the EPC Insight Team

These are our next 5 mini-articles on risks in the *Risks in the Spotlight* series. If you have not already done so, make sure you read Volume 1 (1-10). We've gathered them together in a single document, hoping you will find that a convenient format and a good way of catching up on any that you missed when they were posted separately on our Newsfeed.

Each one is a very short read. But we hope you find them interesting and thought provoking.

### Contents:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Heat Waves</td>
<td>The Heat is on</td>
</tr>
<tr>
<td>12</td>
<td>National Black-Out</td>
<td>Out go the Lights</td>
</tr>
<tr>
<td>13</td>
<td>Surface Water Flooding</td>
<td>Who'll Stop the Rain?</td>
</tr>
<tr>
<td>14</td>
<td>Risks at Events and in Crowded Places</td>
<td>A Face in the Crowd</td>
</tr>
<tr>
<td>15</td>
<td>Dam Failure</td>
<td>When the Levee Breaks</td>
</tr>
</tbody>
</table>
Risks in the Spotlight 11
Heat Waves: The Heat is on

As we brace ourselves for an exceptionally hot day with record-breaking temperatures, it seems right to reflect on the heat wave as a national emergency risk. It is a national risk and it is one that we take seriously. So, we hope everyone will heed the warnings and follow the advice.

What do we know about this risk? Well, this heat wave probably won’t reach national emergency levels – at least in the week ahead. That level (as it’s modelled in the National Risk Assessment) suggests daily temperatures above 28C (night above 15C) for at least 2 weeks, with five consecutive days peaking at over 32C.

That’s the planning model and it is based on last big European heat wave of 2003. So, it isn’t an abstraction. It’s based on a real and relatively recent event. And we know that if an event approaches that level we will have serious health impacts.

What happened in 2003?

Europe had its hottest summer, according to some estimates, for 500 years. It peaked in early August and some places, even relatively northerly parts, suffered extended periods with daytime temperatures over 40C. Amazingly, credible sources suggest that the overall death toll was above 70,000. That is ‘excess deaths’ (over the ‘normal’ expected level) which are thought to be directly attributed to this event.

France was really hit hard. Their official statistic is that 14,802 people (mostly elderly) died. To some extent the French experience is an anomaly. Basically, the nation was on holiday, the risk wasn’t understood and the health care system failed catastrophically.

As the French Red Cross put it, most of those people didn’t die because of the heat. They died because they were isolated and neglected in the heat.

In the UK we think about 2,000 people died as a direct result of the 2003 heat wave - and that is roughly what we would expect if it was repeated. That number alone means that it is taken very seriously. But you can add another factor; it only takes a few very simple, home-help measures to really reduce the risk. That’s why you are getting so much advice from the government and the health services at the moment and why everyone should follow it.

But what about the most vulnerable, who may not be able to care for themselves? They are at the most risk. The health services, local authorities and emergency services are already geared up for this. But communities and neighbours should be on the look-out. A simple intervention could make all the difference.
We’ll close with an observation and question. Part of the French soul-searching after the shock of 2003 involved a painful recognition that their society (in the words of the French Red Cross again) tended to see care for the vulnerable as a problem for the authorities – not for the community. Can we really say that isn’t the case in the UK?
This time on *Risks in the Spotlight* we are looking into the national black-out, brought about by a total shut-down of the national grid. You’ll find it on pages 40-41 of the National Risk Register, the current edition of which is a free download from:


As our main disaster risks go, it’s a bit of a rarity – because it’s not actually happened. Yet. In fact, until quite recently, it was considered a technically feasible but very small risk. Now it’s considered a bit more likely or (more accurately) its likelihood is better understood. This is despite the grid’s operators calling it an “*an unlikely event*” in a 2017 publication. So, although it’s rated quite high overall on the national register, we are – to some extent - in uncharted territory here. To get an idea of what the impacts would look like if it did happen, we must extrapolate from lower-level events (localised and short-term black-outs) and use a bit of deduction.

A sensitive awareness of our almost total reliance on electricity (at least for what we call normal life) gives us a good start. So, this is a thought experiment. Try to identify any aspects of our modern life that do *not* rely in some way on a regular, accessible and dependable supply of safe electricity. You might find the answer (which is ‘not many’) uncomfortable and surprising, but also relatively easy to deduce. You also need to put a time frame on it. It is estimated a total shut down would leave most of the UK without electrical power for around a week, and parts of it for up two weeks or more.

Working out from the home we can deduce that the lights won’t work; some (but not all) landline phones might continue to work but devices won’t be chargeable; electrical and gas heating stops; the fridge stops working; the freezer defrosts and the water supply and sewerage will be cut off or erratic. Shops will close because the tills won’t work, refrigeration fails and deliveries won’t be made anyway. Petrol stations are closed. Schools, businesses and factories shut down. Airports might be able to open to some degree, but you won’t be able to get to them. The streetlights are out and public transport is at a standstill. Now, these are only the first order consequences. Further contingent knock-on effects will kick in and multiply very quickly. This is only a single-paragraph and superficial introduction to a scenario that looks like taking us back to the middle ages. There are, of course, various plans that will keep some (limited) elements of the essential services and facilities going – but you get the picture.
People will dig deep into their own resilience; communities will band together and power will be restored in time. If we take an optimistic view, any unfortunate and regrettable outcomes will be balanced by life-affirming experiences and random (as well as organised) acts of communitarian goodwill. That will be a genuine part of the popular narrative, as it is in all disasters.

It is a positive point that everybody will be in it together. Grid start-up procedures will follow their own systems and network logic, so no area or city can be privileged with early connection. Nobody will be able to jump the queue. We know that hardships tend to be more tolerable when they are perceived to be equitably distributed, so social cohesion might be stronger and more robust than we think – despite the shock. But that will have a limit, and this risk may take us beyond it.

On the negative side it could lead to a generalised and enduring state of anxiety - coupled with a heightened sense of vulnerability and less complacency about what a lifestyle like ours depends on. We would, literally, be in dark times. It will probably happen without notice and at first be interpreted as a local power cut. Quite quickly (in a matter of minutes) it will be clear that it is nation-wide.

We can then expect a degree of frustration and misinformation - with the authorities probably being seen as quite slow (in digital media terms) to get the situation clarified and the public ‘properly’ informed. Whether fair or not, this will be the public perception. There will also be concern over the cause of the black-out, and concerns about safety and public order. Everyone will want to know (urgently) one thing; when will power be restored? But for many that answer could be some time coming.

Thinking about this risk leads us to think about how important communication will be in maintaining public confidence and community resilience. After all, the warning side of the warning and informing strategy should be amenable to forward planning and preparation. So, the public could be prepared.

Also, the severity of the impacts will vary according to the time of year when it happens – so the reasonable worst-case assumption should be mid-winter? Finally, this is about the grab-bag; what back-up means of lighting, heating and non-mains radio reception do we have in our homes and workplaces? Think of the experience of an ‘ordinary’ power cut on a winter’s night. Then think of that lasting a week.
Risks in the Spotlight 13
Surface Water Flooding: Who’ll Stop the Rain?

At the time of writing, the big clean-up is under way in parts of the North of England after flooding caused by the recent exceptionally heavy rain. The damage and disruption is extensive and serious. Fortunately, nobody has lost their life, but many will have lost the life they had. Recovery will be long, difficult and painful.

Some places experienced close to a month’s worth of rain in just a few hours and that is a perfect recipe for surface water flooding in some places. So, how do we understand this risk and why does it often take us nearly by surprise? We seem to get very precise and reliable forecasts and warnings when it comes to the risk of flooding from rivers and the sea. So, what’s different about this risk?

It’s generally caused by a pattern of multiple convective rainstorms (also known as thunderstorms!). They usually depend on a warm earth to force hot air upwards, where it cools rapidly and creates big, heavy clouds. This destabilises the atmosphere and can lead to exceptionally heavy rain. This falls at such a rate that it simply overwhelms the ground’s normal holding and drainage capacity. That’s why they tend to happen in summer.

It’s also why surface water flooding events like this are less predictable than other types of flooding, like from rivers or the sea. The most you can reasonably expect is between 24 and 6 hours of advanced warning. Even then, predictions are generally less reliable and usable. It is possible to predict the amount of water that is likely to fall, but it is very difficult to predict exactly where it will fall – even if you know it’s coming to a certain region. So, it is a very localised and short-lived event – at least as far as the immediate impact is concerned. They also have a very rapid (even sudden) onset – hence the popular expression ‘flash flood’. The severity of that will depend on very local physical geography.

Other factors complicate the response and recovery picture. Rescue needs specialised equipment and vehicles – which may have to get there through the floods and over roads and bridges that may have been washed out. Other vital infrastructure will be trashed, like electricity sub-stations, water and sewage plants and telecommunications. You will have seen these images in the news over the last few days. This can delay both the response and recovery effort – extending the possible time period to a year or more if substantial rebuilding must be done.

It seems safe to say that people, communities, infrastructure operators and businesses are less aware of, and less prepared for, this type of flooding. This is not because it’s rare: it’s common enough at a national scale. But it seems to be more evenly distributed and doesn’t have a pattern of recurring in the same, familiar sorts
of places. So, it tends to be a ‘freak’ event - not a visible feature of the local ‘risk landscape’ – until it happens. For example, if you live by the river in York or on the Somerset Levels, you will probably understand a fair amount about fluvial (river) flooding! But if you live or work on relatively high ground, comfortably far from any rivers, there is little reason to suppose you are vulnerable to this risk. And in some respects you aren’t actually more vulnerable than anyone else.

This seems to leave us with a risk that is expected to happen moderately frequently, can happen almost anywhere and is very difficult to predict with any useful accuracy. Add to that the acknowledgement that climate change will probably increase both its frequency and its severity.

We have a dedicated warning service for both riverine and coastal flooding, but not one for surface water flooding. That may be due to a recognition that we simply can’t do it with enough accuracy and reliability to make it worthwhile? Nevertheless, a few such incidents over the same summer might very well lead to calls for setting up some form of surface water flood warning service.
Now that we’ve launched the latest edition of our national guidance ‘Working in Safety Advisory Groups’, we’ve reflected on how far we have come in recent years – and how far we haven’t!

Working here at the EPC is a privilege because we get to work with many different industries and organisations across the public, private and not-for-profit sectors. We get to meet professional groups and commercial organisations which are trying to make a difference. We also get to hear of the latest news and issues first-hand. Something that concerns us now is the news of local Safety Advisory Groups (which co-ordinate the multi-agency approach to safety at large public events) being wound up in some areas. Is that, well…safe?

We think not. The events industry is busy, highly dynamic and new lessons are being identified all the time. Every such gathering, event or festival has serious risks that must be collectively managed. Also, our crowded places are more crowded than ever and therefore riskier in many respects. Thinking back; reflect on the UK’s ‘Decade of Disaster’ and how many of them involved or occurred in crowded places and how that trend has continued since then – right up to the Manchester Arena atrocity.

One of the key issues for us is that no single agency co-ordinates learning, development and standards in the event industry nationally. There is no analogue of the Civil Contingencies Secretariat for the events business. What we have instead is a patchwork of different agencies doing (great) things separately and developing useful guidance (separately). This is progress by (sometimes disjointed) incrementalism, not by formal coherent strategy at the multi-agency level.

So, if that’s the national picture, and we think it is, it seems even more risky to abandon the practice of having multi-agency Safety Advisory Groups at the local level. We suspect that the reason is the predictable one: increasing numbers of things to do and diminishing resources, leading to difficult decisions about what to stop doing.

Perhaps it hasn’t helped that crowd and event safety is at least partly fenced off from the mainstream of ‘civil protection’. This is even though Local Resilience Forum members and assets will be central to any response if things go badly wrong. It’s no accident that the EPC approach for years has been to advocate the Integrated Safety Management model. And yes, it should look familiar – it’s also known as Integrated Emergency Management, the basic instrument of civil protection and emergency management. What we’ve been trying to achieve is the same thing – a standard basic approach which is the first step towards a more coherent family of guidance and standards for the crowds and event world.
Back at the turn of the century, the responsibility for civil protection was transferred from the Home Office to the Cabinet Office precisely because it needs unified cross-government co-ordination – as well as someone to ‘own’ its framework legislation. The risks of crowds and events don’t have that single home in government, so it’s less than surprising that it also lacks formal common statements of practice – what some in civil protection call its ‘doctrine and standards’.
At the time of writing it looks as if a complete failure of Toddbrook reservoir dam may have been averted, after nearly 5 days of massive effort by responders. But it’s too early to be completely sure and many people are still evacuated from their homes in Whaley Bridge as a precautionary measure. Dealing with it means pumping out the reservoir whilst shoring up the dam itself, which sounds deceptively simple. It isn’t, of course! To put the scale of an event like this in context, some comparison with the last similar one in the UK is useful. In 2007 the Ulley reservoir in South Yorkshire had to be pumped out to prevent the dam collapsing. It took 2,600 tonnes of stone to shore it up, three years to repair and cost £3.8 million.

Dam failure is a known risk. It is on the National Risk Register and its likelihood is described by the Cabinet Office as ‘very low’. The ‘reasonable worst-case’ used to model this risk is based on a sudden (no notice) catastrophic failure of a major dam. The fact that we have come uncomfortably close to this risk being realised twice in 12 years might give cause to re-visit that assessment?

It has been suggested that we have one of the best dam safety regimes in the world, and the track record seems to bear that out. The UK’s worst failure was the sudden collapse of the Dale Dyke dam near Sheffield in 1864. The resulting flood killed 244 people. But there has not been a catastrophic failure in the UK causing loss of life since 1925. On the other hand, The Chair of the British Dam Society recently said that there have been “many recent near misses”. Globally, there have been 40 dam failures this century. So far.

Her presentation can be found at:

https://www.engineersireland.ie/EngineersIreland/media/SiteMedia/groups/Divisions/civil/Historic-Dam-Failures-slides.pdf?ext=.pdf

She also pointed out that the average age of dams in the UK is 115 years, before going on to suggest that there is uncertainty about what impact extreme weather associated with climate change will have on dam safety. In fact, 43% of UK dams are over 100 years old. Some 2,100 dams fall under the Reservoirs Act 1975 and are regulated. Consequently, they are subject to a stringent safety regime with regular checks; local emergency planning is a requirement. Comprehensive and detailed mapping of all the associated inundation zones is available to help responders plan and prepare. If you want to know more, follow this link and click on ‘Flood risk from reservoirs’:

But that does not cover all reservoir dams. In respect of those which are deemed too small or of low-risk types, the responsibility for their safety lies with the owners. They represent a level of risk that will probably be managed through local generic emergency arrangements in most areas.

The threat to life is the main issue, of course. There are dams in the UK with the potential, if they failed catastrophically, to kill up to 200 people and destroy or severely damage up to 500 properties. However, some American research suggests that fatality rates would fall very sharply if even small amounts of notice (in minutes) could be given. But the other potential impacts are also significant.

In some cases, the ‘downstream’ impacts could extend for up to 60 kilometres. This would involve damage to essential infrastructure like gas and electricity networks, telecommunications and roads and railways. Water supplies would be disrupted. For example, if the Ulley dam had failed in 2007 it would have put local residents in harm’s way, but also part of the M1 motorway, sewerage works, high-pressure gas mains, and electricity substation and part of the national grid. That near miss actually led to a review of the Reservoirs Act 1975 that tightened up the emergency planning requirements and made them more consistent across the country.

Most of these effects would be relatively short-lived, but the social dislocation would be more lasting. If it happened there would inevitably be concerns about safety in all communities that live within the inundation zone of a reservoir, so public confidence would become an enduring national issue. Guidance for emergency planners on how to communicate with the public about this risk can be found at this link: