

Climate Change and Flood Risk

Flooding can have a devastating impact on industrial facilities in terms of safety, the environment, asset damage and operational downtime. In the UK, flooding is the most frequent and widespread natural hazard, and with climate change, flooding is expected to become more of an issue in the future.

The UK Climate Projections in 2009 (UKCP09) stated that the UK should expect to see an increase in the frequency of intense rainfall events. Whilst it is difficult to attribute individual extreme weather events to climate change, recently observed floods are consistent with the UKCP09 predictions. This was further corroborated in the 2018 update of UK climate predictions (UKCP18), which confirmed that the UK should expect:

1. warmer, wetter winters,
2. hotter, drier summers, but with increases in the intensity of heavy summer rainfall events, and
3. increases in frequency and intensity of extreme events.

The implications of increases in rainfall intensity and frequency are of the most concern. Urban drainage systems are typically designed for 1 in 50-year events, so as the frequency and intensity of extreme events increases, so will the flood risk, to the point when an extreme event becomes a likely event within the lifetime of a typical facility.

Flood Preparedness is recognised by both Government and industry as a high priority, with recent flooding affecting several major hazard establishments that are subject to regulation under the Control of Major Accident Hazards Regulations (COMAH) 2015. Flood preparedness has, accordingly, been designated a strategic topic by the COMAH Strategic Forum.

How can an Industrial Facility Prepare?

Flood management should be risk-based, and fundamental to this is a sound understanding of the variables in the risk balance. ABS Group has been assisting the facility operators for many years in risk assessment, mitigation and emergency response planning for flood risk. Based on our experience, the key steps a facility should address include:

1. It is important that the facility operator understands the flood hazard for their location. This should include not just the water level, but flow velocity, hydrostatic loads, potential debris, contamination, flood duration, etc. The return period is fundamental to the understanding,

but climate change is creating some uncertainty here. Sensitivity studies can be applied to the hazards to identify potential cliff-edge effects.

2. Map out the expected threat timeline from warning through to floodwaters affecting the site. This will help establish what mitigation can be implemented beforehand and during any flood event.
3. Understanding the potential consequences, considering the impact on: property, equipment, raw materials, finished products, etc. This requires specific knowledge on water ingress mechanisms, flood defence effectiveness and equipment vulnerability.
4. Estimate potential business interruption by considering: operational downtime, clean-up/decontamination, start-up/commissioning, supply chain issues, workforce availability, etc.
5. Estimate potential safety and environmental impacts by identifying flood-induced losses of containment.
6. If there are potential major accident scenarios related to the flood risk, ensure the risk assessment considers:
 - a. vulnerabilities in: fixed plant and piping, EC&I systems, utilities and shut down systems,
 - b. flood barrier effectiveness/reliability and cliff edge effects,
 - c. human factors associated with planned / emergency operator actions, and
 - d. the effectiveness of internal and external emergency response.

Flooding can have a devastating impact on industrial facilities and local communities, but the risk can be managed with a good understanding of the hazard, the potential consequences and a robust risk-based methodology.



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