

NaTech Hazards – How Can We Effectively Understand and Assess the Risks?

Natural Hazards Triggering Technological Accidents (NaTechs) lie at the intersection of the natural environment and industrial activities, potentially resulting in severe consequences for both human safety and the environment. As the frequency and severity of natural hazards increase due to climate change, it becomes crucial to effectively understand and assess the risk associated with NaTech events. By implementing proper safeguards and risk reduction strategies, industries and communities can mitigate potential disasters caused by these hazards.

What is a NaTech Hazard?

Firstly, we must understand what is meant by the term 'natural hazard'. Natural hazards are extreme events that occur within the natural environment and pose a risk to society and/or the wider environment. In general, threats from these hazards are categorised between people, goods and environment. In certain scenarios, a domino effect can lead to a secondary hazard, for instance, an earthquake may trigger a landslide, and in turn a volcanic eruption (e.g., the 1980 Mount St Helens eruption). The possibility of secondary hazards must be understood when responding to natural hazards.

The term NaTech refers to instances in which natural hazards initiate events which challenge the safety and operation at hazardous installations. An example of this would be loss of utilities, a significant risk associated with most natural hazards due to issues such as downed power lines, burst water/gas lines etc. This may impact a site's ability to operate normally and safely under these conditions. Any impact a natural hazard can have on a site which has the potential to impact the safe operation of the site is therefore considered a NaTech risk. So, how do we assess this risk?

Understanding and Assessing the Risk

There is a series of questions we must ask ourselves when assessing NaTech risk:

What are the natural hazards of concern? - Only once you know where the risks are coming from can we begin to understand and plan for them.

What are the consequences of the natural hazard; both direct and indirect? - Direct consequences include situations such as physical loss of containment due to damage caused by the natural hazard. Indirect consequences are those which can occur when the site itself is not impacted by the initial event. The consequences of natural hazards can impact a widespread area and can result in the loss of utilities or site access which may then have a knock-on effect at the site, e.g., due to loss of power, or water. By understanding these events, the risk picture can begin to form with sites understanding areas of vulnerability to natural hazards. It is also vital to ensure that any secondary hazards are identified as the design may be suitable for the primary hazard but not the secondary hazard.

What is the risk of this natural hazard? - What is the possibility of the natural hazards you have discussed leading to a NaTech event? It is important to be aware of the likelihood of these events happening, though a low likelihood does not negate the need for sufficient measures to be implemented.

What safeguards are in place to mitigate the risk? - Any site handling hazardous substances should have safeguards in place covering a range of hazards. It is important to note that NaTech hazards may be responsible for the loss of multiple safeguards. Sites should understand the impact of NaTechs on the current safeguards and determine whether any safeguards are designed to be operational in the event of a NaTech incident.

What more can be done to reduce the risk? - Can any additional NaTech-specific safeguards be implemented? Not all barriers are designed to function in a NaTech event, so users should be cautious when crediting existing barriers.

An additional question to consider is the impact of Climate Change - It is important that efforts are made to implement measures that will provide safety down the line, using climate change forecasts to determine what the risk may look like for the site in the future.

The topic is a complex one, extending much further than discussed here. RAS is contributing to efforts to tackle this issue and will be presenting a paper, "NaTech Hazards – What they are, why we should care and what we can do." at IChemE's Hazards 33 Process Safety Conference in Birmingham on Thursday 9th November.

For further information visit
<https://www.ras.ltd.uk/>