Understanding natural hazard risks to your site

Natechs (Natural Hazards Triggering Technological Accidents) refers to accidents initiated by natural causes, including earthquakes, lightning and flooding, all of which have the potential to impact high hazard industrial sites. Major accidents have the potential for catastrophic consequences to people and the environment as well as business reputation and sustainability. Such natural hazards can both trigger major accidents and weaken safeguards in place to prevent, control and mitigate them. For this reason, the risk posed by Natechs needs careful consideration.

Natural hazards can be broadly categorised as seismic, hydrological and meteorological (e.g. earthquakes, flooding and wind storms respectively) and will have different likelihoods, severities, warning times and consequences. Generally, natural hazards will impact widespread areas. Climate change also plays a role, typically increasing the likelihood and severity of hydrological and meteorological events.

An example of a Natech accident in recent history is the floods that occurred in Central Europe in August 2002. In total, 232 lives were lost and one site, in the Czech Republic, was struck particularly hard. Large volumes of chlorine gas were released from pressurised storage tanks. The flood itself was a one in five hundred year event and as such, the severity was unprecedented, with the hundred year water level of the site being exceeded by 1.3 metres. Whilst it may not be practicable or justified to implement safeguards for events of unprecedented scale and severity, consequences involving the loss of containment of hazardous substances are still possible during lesser events, highlighting the importance of robust safety measures. Since the consequences of Natech events are often severe, just being aware of them is not enough and the duty holders of hazardous sites must be proactive in their approach to understanding, assessing and managing the risk.

Risk reduction and preparedness for natural hazards is something which is often overlooked. There is a requirement under the COMAH Regulations and the Seveso directive for sites to understand their risks from natural hazards, with some other countries having specific laws/ programs regarding the protection of people from earthquakes and/or tsunamis. There is however a shortage of dedicated methodologies and guidance for assessing and managing Natech risks. In addition, for some natural hazards there is a limitation to the measures which can be implemented, and other measures may be deemed too costly, especially if considering the likelihood of the natural hazard event at the site versus a non-Natech major accident hazard event. Many measures in place to prevent a major accident hazard may not work in a Natech incident, meaning that crediting these barriers needs to be done with caution.

The use of hazard mapping, such as flood maps, may be useful for understanding the current risk, and can include inundation areas in the event of sea level rise and climate change. In New Zealand, GNS Science have provided vulnerability and evacuation maps to the government, authorities and private industry which focus on the possibility of a tsunami. The maps show the areas in the most danger and provide vital information for evacuation planning. These types of maps can also be available for other natural hazards such as volcanoes and can be used to help inform site emergency response plans, as well as the emergency response plans for the local authorities. It should be noted however that in a Natech event, there is a reasonable chance that emergency response teams would not be able to reach the site(s) requiring support. This may be due to damaged access roads, services being overwhelmed by the public, or the services themselves being affected by the hazard. This may reduce the resources available to sites in an emergency and should be considered in response planning.

There is no ‘one size fits all’ when it comes to specific sites and hazards. Therefore, duty holders need to understand the risks posed by Natech events to their specific site and then ensure they are informed of what equipment may be impacted, how, and what to do in the event of a natural hazard. Although there may be a low likelihood, natural hazard events can often be a case of ‘when’ not ‘if’, and so we must be prepared for their eventuality.

For further details visit https://www.ras.ltd.uk