

The Perfect Storm

COVID-19 and Extreme Weather Events

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The recurring surges in confirmed COVID-19 cases throughout the world suggest that SARS-CoV-2 will play a significant role in our lives well into 2021. While much has been written about the negative economic impacts of the pandemic in terms of lost jobs and decreased productivity, the substantial challenge it poses to continued safe industrial operations has received less attention.

Industrial facilities, onshore and off, were never designed to contain a lethal coronavirus outbreak; they were designed for operating efficiency. The petrochemical industry, for example, has recognized these industrial design challenges and stepped up its health screening and cleaning procedures in response to the global pandemic. Social distancing alone provides a substantial challenge to continued safe operations, but these challenges are magnified when we consider that many industrial facilities use skeleton crews or crews who have been on site for long periods to help minimize the spread of the virus.

These labor practices raise their own specter of the potential for human failure. However, as we head into fall, these industrial risks are potentially compounded not only by the dynamic nature of the pandemic but by potential impacts from the [ongoing daily effects of climate change](#)¹ and by [extreme weather events](#)² associated with a hurricane season that, with two more months to go, is already the second most active [Atlantic hurricane season](#)³ on record.

The labor challenges brought on by the pandemic coupled with possible extreme weather events create a perfect storm. This is especially concerning when we consider that there are hundreds of petrochemical facilities stretched along the I-10 corridor from Houston to New Orleans and over 3,200 active petroleum/gas offshore structures in the [Gulf of Mexico](#)⁴.

In this time of COVID-19, it is more critical than ever for industry to proactively reassess the structural and environmental risks associated with their facilities to ameliorate the potential impact from this perfect storm. This includes using updated models and engineering approaches to better understand the forcing functions, engineering stresses, and resultant hazards that may occur in their facilities; using probabilistic engineering and environmental modeling to identify existing vulnerabilities; and using relative risk approaches to better assess the release and exposure factors in terms of likelihood versus consequence of the risk. Such an approach would update existing industrial facility risk evaluations by incorporating personnel limitations caused by the pandemic, using models that account for extreme weather events (e.g., flooding) caused by climate change (e.g., sea level rise), and more realistically identifying potential environmental impacts.

¹ https://tidesandcurrents.noaa.gov/publications/Techrpt_092_2019_State_of_US_High_Tide_Flooding_with_a_2020_Outlook_30June2020.pdf

² <https://www.ncdc.noaa.gov/billions/>

³ <https://www.wsj.com/articles/hurricane-season-is-so-bad-that-we-are-running-out-of-names-11599841440?mod=searchresults&page=1&pos=1>

⁴ <https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Offshore%20Structures>

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The outcomes from this analysis can then be used to guide management in how best to mitigate these additional risks either by modifying equipment and minimizing the hazard or making facility changes that decrease vulnerability. For example, a unit within a facility or the whole facility may be decommissioned based on the high risks and high costs to successfully mitigate that risk. Alternatively, efforts may be taken to enhance the facility's structural integrity to be able to withstand the increasing extreme weather events. Such an analysis should be conducted across a company's portfolio of facilities to help management understand where best to focus their funds to protect their employees and the public.

With the challenges caused by COVID-19 and the destructive potential of extreme weather events, the perfect storm is before us. Proactive approaches that have proven helpful in informing industrial resiliency include⁵ reassessing facility-level risk based on updated climatological information and personnel changes and integrating these engineering risks with ensuing environmental risks to develop contingencies for senior management. As we face these dual impacts, ensuring senior management's ability to evaluate how best to minimize possible business disruptions is critical to protecting our companies and communities.

How Exponent Can Help

Exponent's environmental and structural group practices have a tested record of working with clients to solve complex, weather-related issues. If you are interested in learning more about how Exponent can assist with your facility's weather resiliency, click on our topic expert below.

⁵ <https://aiche.onlinelibrary.wiley.com/doi/full/10.1002/prs.12087>



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