

Climate risks a sea-change for mine planners

Climate events have interrupted mining projects in the past few months, and mining companies need to incorporate these into mine planning.



Miners need to plan ahead for increasingly frequent climate events

Future Of Mining > Sustainability Climate change is making its presence felt, and the mining sector must make appropriate changes to avoid being swept away by unexpected weather events.

Comments

Share

Jax Jacobsen

Mining projects, which abound in the Global South, will increasingly be forced to contend with these severe effects from changing climate patterns and intensifying storms.

Between 30% and 50% of the production of critical minerals - which include copper, gold, iron ore, and zinc - is situated in areas with high levels of water stress, a report from McKinsey & Company found in August 2020. As mining has been a water-intensive industry for decades, increasing droughts and water shortages throughout the globe constitute a substantial business risk.

Soaring temperatures paired with diminished rainfall in some areas of the world increase the risk for bushfires, as was witnessed in Australia last year, and raise risks for mining workers on-site, whether it complicates underground ventilation systems or makes workers more susceptible to heatstroke and heat exhaustion.

Climate-related events have led to several interruptions in mining projects in the past few months.

Brazil, Vale was **forced** to suspend operations at several mines in Minas Gerais, following the onset of severe rains which flooded highways and forced railways to stop operating for several days.

British Columbia, a weather phenomenon known as an atmospheric river led to unusual amounts of rainfall, in addition to mudslides and flooding, with serious impacts for local mining companies.

Temporary road closures meant Copper Mountain Mining's trucking of copper concentrates to the Vancouver port was delayed.

Teck Resources reported service interruptions on rail between its West Coast terminals and its operations. The disruption meant Teck's December quarter coal sales fell from an estimated 6.4 million to 6.8 million tonnes to 5.2 million tonnes to 5.7 million tonnes.

Call to action for mining companies

Mining companies need to start building capabilities to ensure climate resilience, Deloitte Mining Leader in Toronto Andrew Swart told *Mining Magazine*.

"One thing that mining companies should be doing is evaluating risk associated with all areas of their value chain," he said. "Our observation is that we don't think enough mining companies are really looking at this particular issue at the level that they should be."

Mining companies need to consider the impact of extreme weather and climate changes, especially when designing greenfield mine infrastructure that will last for several decades, Swart said.

"Many companies together are looking at climate-related events as being 'black swan' events," he said. "There is a shift needed to consider them to be less of a 'black swan' event but the sort of event that could be happening with increasing frequency."

This includes understanding how mining operations will secure their water supply to ensuring that outbound logistics - which includes roads and rail - will be able to function in all climate scenarios.

When it comes to ports, mining companies have to make other considerations, Swart said. "When running big port infrastructure, you need to consider what the longer-term effects of rising sea levels" will have these logistics, he said.

Companies also need to take into consideration the impact on their customers.

"If you have an off-take agreement with a particular company, and they are taking their product but are impacted by climate change - whether it's floods, or rising sea levels - what impact does that have on your particular operations?" Swart said.

Mining companies also need to think about how their inbound logistics will work.

"When it comes to open-pit versus underground, floods can impact many different areas of the mine," Swart said. "If you think about a mine's ability to bring in goods and services," this will also be affected, he said.

Operational and mindset changes

The first shift that needs to happen is in terms of preparedness, said Shervin Teymouri, chief executive at Minelt Consulting and adjunct mine engineering professor at the University of British Columbia.

"Traditionally the mining industry has been very slow to adopt new technologies, like a caterpillar, and can't adjust very quickly," Teymouri said. But it's critical for companies to be aware of changes in regulations and understand what direction changes are moving in.

It will also require a fundamental shift in how mining engineers calculate their Net Present Value in feasibility studies.

Mine engineers' top priority at the moment is optimising NPV for economic production, Teymouri said.

"But the NPV isn't good enough anymore. We have to optimise for more than revenues and cashflows."

Teymouri is developing an alternative method of calculating a mine's economic value, by incorporating social license and climate mitigation into the assessment. He hopes to complete a white paper on this topic by the end of the year.

"The Sustainability Present Value [metric] means you adjust priorities," he said. "The water that you may get and what you might not get yet, as well as extreme weather, extreme temperatures, glaciation melting - how is it impacting operations?"

The measure would also incorporate information on whether mining companies are transitioning from diesel to electric trucks, and where it is sourcing its energy.

Incorporating these factors in addition to the traditional inputs for NPV calculations will leave miners better prepared to face climate disruption, he said.

Mining companies can no longer exempt themselves from planning for unforeseen events.

"As a miner, you have to identify what these outliers and extremes are" when undertaking mine planning, Teymouri said. "You can't say, 'This is an outlier and we shouldn't worry about it.'"

Beyond changing how mining companies calculate whether a project is economic or not, there are measures that companies can take to minimise the impacts of climate disruption.

In areas at risk of heavy rainfall and floods, dewatering tailings is necessary, Teymouri said.

"We need to dewater the entire tailings storage facility to use dry stack, and it's a massive undertaking," he said. "You need to take these actions right away, and it will cost you. It will be a lot of capex up front.

But you will see benefits in your operating expenses, and could obtain some carbon capture credits. And then you can get in good standing with the community," he said. Mining companies will need to undertake this kind of

preventative maintenance to maintain their mining operations and their social license.

Mining companies can do more to minimise their ecological footprint to mitigate climate issues, with the added positive of earning the buy-in of local communities, Teymouri said.

One area where mining companies need to improve is in how much land they disrupt when mining.

"There are projects out there that are 15:1 - which means you need 15 times more waste to process 1 tonne of metal," he said. "That's huge." Finding ways to lower the amount of ore extracted is critical in improving mining operations' ability to withstand climate disruption, he said.

Another way to lower the ecological footprint is to expand reclamation activities beyond the mine site.

"If you're taking out an entire 5 kilometre by 5-kilometre area, build up another 20 kilometres by 20 kilometres of the artificial forest," he said. "It will help with overall community engagement, as well as permitting. Build up the ecological footprint around a mine so you can take advantage of the [ensuing] community positivity [around the project.]"



Aspermont
Information for Industry

Copyright © 2000-2022 Aspermont Media Ltd. All rights reserved. Aspermont Media is a company registered in England and Wales. Company No. 08096447. VAT No. 136738101. Aspermont Media, WeWork, 1 Poultry, London, England, EC2R 8EJ.